Vol. 17. No. 6 JUNE, 1940

The AMERICAN JOURNAL of OPTOMETRY

EDITORIAL BOARD

CAREL C. KOCH

GUY L. DuPLESSIS CLARENCE W. MORRIS

COLLABORATORS

A. N. Abbott, *Shawano, Wis.*
Ralph M. Abel, *St. Louis, Mo.*
J. O. Baxter, Jr., *New Bern, N. C.*
J. O. Baxter, Sr., *New Bern, N. C.*
R. C. Baxter, *Warren, Ohio*
Robt. J. Beitel, Jr., *Southbridge, Mass.*
Robert T. Best, *Fairmont, Minn.*
F. W. Brock, *New York, N. Y.*
W. I. Brown, *New Bedford, Mass.*
Brant Clark, *San Jose, Calif.*
J. Robinson Cohen, *New York, N. Y.*
W. R. Cramer, *Memphis, Tenn.*
O. I. Crawford, *Marion, Ind.*
Howard C. Doane, *Boston, Mass.*
James H. Drakeford, *New York, N. Y.*
Israel Dvorine, *Baltimore, Md.*
T. H. Eames, *West Somerville, Mass.*
W. V. Emmons, *Boston, Mass.*
W. S. Farmer, *Oklahoma City, Okla.*
Ida Feinbloom, *Brooklyn, N. Y.*
William Feinbloom, *New York, N. Y.*
L. P. Folsom, *South Royalton, Vt.*
Glenn A. Fry, *Columbus, Ohio*
H. K. Fulkerson, *Somerset, Ky.*
W. H. Glazer, *Philadelphia, Pa.*
J. D. Goodsell, *Los Angeles, Calif.*
Nelson Greeman, *San Antonio, Texas*
Ralph N. Green, *Boston, Mass.*
R. Greenspoon, *Beverly Hills, Calif.*
Harris Gruman, *Lebanon, Pa.*
R. M. Hall, *Cleveland, Ohio*
Wm. Henning, *Chicago, Ill.*
E. E. Hotaling, *New York, N. Y.*
E. A. Hutchinson, *Los Angeles, Calif.*
Charles E. Jaeckle, *Newark, N. J.*
Lewis H. Kraskin, *Washington, D. C.*
G. A. Mac Elree, Jr., *Philadelphia, Pa.*
D. J. Mayer, *Riverside, Calif.*
O. J. Melvin, *Omaha, Nebr.*
Leo G. Miller, *Lincoln, Nebr.*
Ray Morse-Peckham, *Detroit, Mich.*
John C. Neill, *Philadelphia, Pa.*
J. Neumueller, *Southbridge, Mass.*
C. R. Padelford, *Fall River, Mass.*
D. R. Paine, *Topeka, Kans.*
W. W. Parker, *Toronto, Ont.*
G. A. Parkins, *Ord, Nebr.*
Ernest Petry, *Rochester, N. Y.*
Harry E. Pine, *Chicago, Ill.*
H. S. Player, *Stockton, Calif.*
A. R. Reinke, *Oakland, Calif.*
S. M. Robinson, *Prescott, Ariz.*
M. Rosen, *Philadelphia, Pa.*
E. LeRoy Ryer, *New York, N. Y.*
Charles I. Saks, *Syracuse, N. Y.*
Carl Shephard, *Chicago, Ill.*
R. Simpson, *Pasadena, Calif.*
William Smith, *Roxbury, Mass.*
Charles R. Saul, *Philadelphia, Pa.*
B. L. Spanier, *New York, N. Y.*
H. Riley Spitler, *Eaton, Ohio*
M. Steinfeld, *Paducah, Ky.*
William J. Tait, *Philadelphia, Pa.*
H. D. Tansley, *Kenora, Ont.*
W. L. Van Osdol, *Indianapolis, Ind.*
R. N. Walker, *Winston-Salem, N. C.*
George T. Warren, *Washington, D. C.*
A. D. Wheelock, *Des Moines, Iowa*
E. G. Wiseman, *Buffalo, N. Y.*
Arene T. Wray, *Los Angeles, Calif.*
Norman A. Zevin, *Philadelphia, Pa.*

Published Monthly by the American Journal of Optometry Publishing Association,
1501 Foshay Tower. 821 Marquette Ave., Minneapolis. Minn.

ANNUAL SUBSCRIPTION $4.00 CANADA $4.50, FOREIGN $5.00
Single copies, 50c

Entered as second-class matter February 20, 1924, at the postoffice at Minneapolis, Minnesota, under the Act of March 3, 1879.

There's a place in this picture for you!

Betty Blichert wears the new Ray-Ban "Stroller" which comes in flesh or blond zylo and in three eye sizes and four bridge sizes.

The large Loxit Rimless Ray-Ban is worn by Howard Berhalter. This style is available in two lens sizes and two bridge sizes.

There's a place for you in every outdoor picture this summer. America is buying sun glasses—millions of them—and you can easily profit from this demand.

More than ever the trend is to Bausch & Lomb Ray-Bans for their smart styling and restful comfort. Recommend them, both plano and ground to prescription.

Do you have the new Riggs sun glass catalog? It shows all Ray-Ban styles and the many other popular ground and polished sun glasses in the Riggs line. Write Riggs, Chicago, for it today.

Distributed by RIGGS OPTICAL COMPANY

Ray-Ban

AMERICAN JOURNAL OF OPTOMETRY

Vol. 17 JUNE, 1940 No. 6

CONTENTS

Page

ORIGINAL PAPERS

Some Factors in Human Measurement. C. A. Whitmer 241
Measurement of the Angle of Squint by Means of the Opthalmograph. W. A. Meyer 250
Aniseikonia. K. B. Stoddard 253
The Remedial Possibilities of Light Therapy in Chronic Congestive Glaucoma. Charles I. Saks 267

EDITORIALS

Recommendations as to the Method of Establishing a Program of Public Relations for Optometry. Carel C. Koch 269

PROCEDURE AND INSTRUMENTATION by G. L. DU PLESSIS.

Orthoptic and Reading Technicians 272
Red-Free Mercury Arc Lamp 273
An Optical Tonometer 273
A New Light-Weight Trial Frame 274

ORGANIZATION AND JURISPRUDENCE by CLARENCE W. MORRIS.

A Public Relations Counselor for Optometry 275

CORRESPONDENCE

Presbyopia and Convergence Insufficiency. Comments Upon a Case Report. O. J. Melvin 280

SPECIAL REPORT

Comments on the Proposed Activities of the Educational Council. W. S. Farmer 282

BOOK NOTICES

The British Orthoptic Journal 287
Bothman's Fundus Atlas. Louis Bothman 287

ABSTRACTS

The Interpretation of Visible Pulsations in Retinal Arteries. John E. L. Keyes and William F. Hatcher 288

IN THE AMERICAN JOURNAL OF OPTOMETRY **for July**

THREE OUTSTANDING ORIGINAL PAPERS

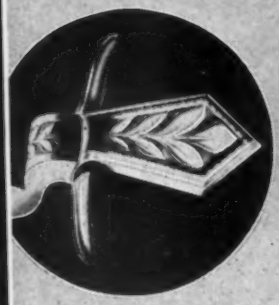
Reduction of Myopia. A case report.
by Dr. M. Thoma, Milwaukee, Wisconsin.

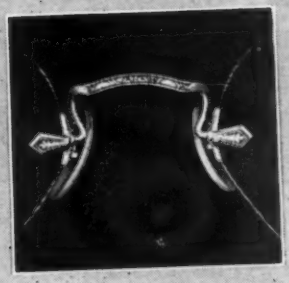
Monocular Convergent Strabismus.
by Dr. J. H. Lepper, Mason City, Iowa.

Scleritis. Its mechanism and interpretation.
by Dr. Charles I. Saks, Syracuse, New York.

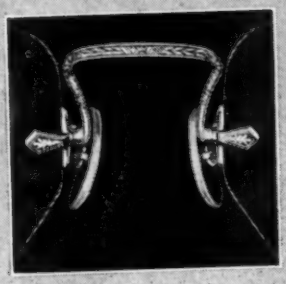
Also:—**Current Comments** by Koch—Thought producing original material in those two unusual departments, **Procedure and Instrumentation** by DuPlessis, and **Organization and Jurisprudence** by Morris—Technical Editorials—Book Notices—Special Reports—Abstracts—Correspondence. All dealing with new discoveries, methods, application and conclusions written by and for the practicing optometrist.

ORDER YOUR COPY TODAY

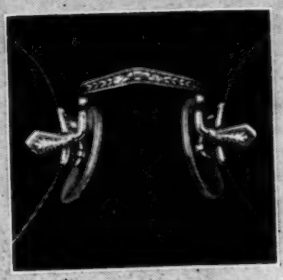




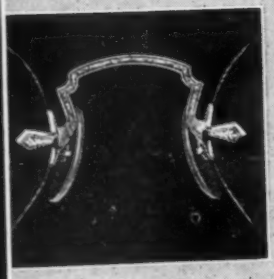
BERWYN



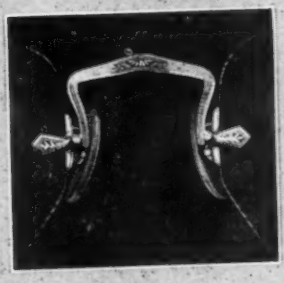
COLTON



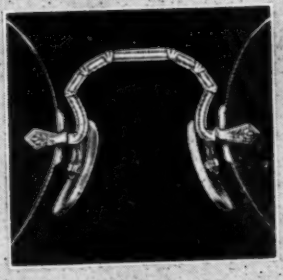
BENTON



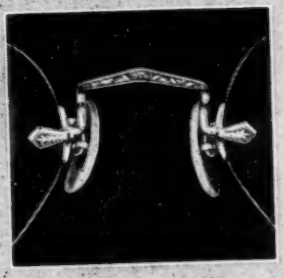
STRATFORD



PLYMOUTH

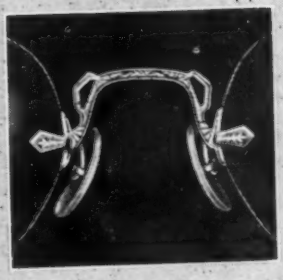


WILSHIRE



PELHAM

WESTFIELD

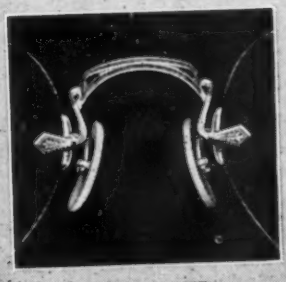


WARRINGTON

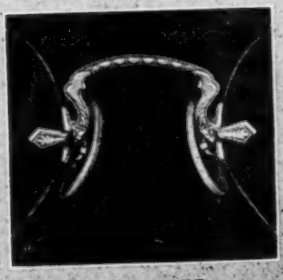
WILLOBY

WALFLEX

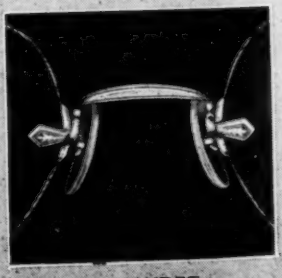
WOODFORD



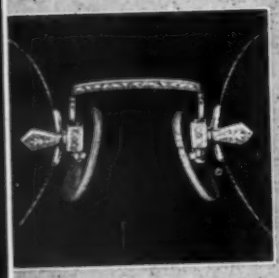
HIGHLAND



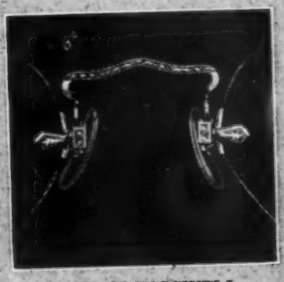
RICHFORD



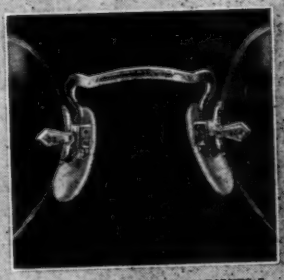
MONROE



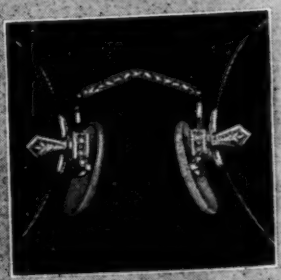
REGULAR CLINGSWELL



HY-CLINGSWELL



BERWYN CLINGSWELL



GOTHIC CLINGSWELL

Bausch & Lomb

RIMLESS FOR BEAUTY . . . .
SCREWLESS FOR STRENGTH

Loxit* for Style

Year by year, public acceptance of glasses has increased. Credit for this triumph of right must be accorded to a variety of factors—to the growing popular knowledge of the importance of adequate correction for defective vision, to increased refractive skill, to the fact that glasses today can be an integral part of any cosmetic scheme—that stylish glasses properly fitted actually enhance the appearance of the wearer.

The part played by rimless in this movement cannot be over-estimated. And it was the announcement of Loxit*, the pioneer screwless mounting, that gave impetus to the popularity swing to rimless. Today the mechanical superiority, the strength and serviceability of Loxit* construction is an accepted fact. To broaden the usefulness of Loxit* to practitioners and patients, Bausch & Lomb today offers a complete range of bridge styles in Loxit* as shown on the opposite page. Plenty of room here to make a happy choice for every fitting problem—plenty of reasons why hundreds of practitioners are standardizing on Loxit*.

PRESCRIBE BY NAME

*Loxit—the Bausch & Lomb molded rivet mounting.

This Summer

This summer you can tune your patients' eyes to the sun's most comfortable wave length by specifying AO Calobar lenses for their outdoor glasses. AO Calobar screens out both ultra-violet and infra-red rays without appreciably affecting color values — an important advantage over ordinary sun glasses.

Calobar, of course, does not disturb comparative visual acuity and its cool green shade is restful and pleasing to the eyes.

AO Calobar is available to your patients in plano lenses mounted in a variety of attractive zyl and metal frames, and for those who need correction with their glare protection—on prescription in the corrected curves of Tillyer Lenses. This summer help your patients discover the advantages of AO Calobar lenses.

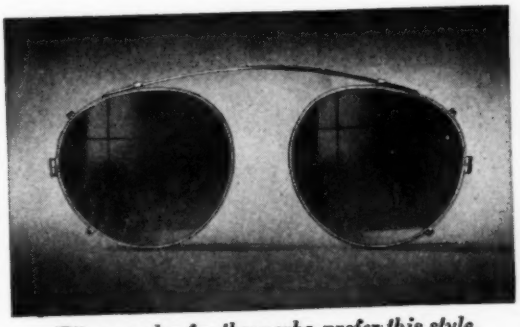
TRUE VISION
AO
AMERICAN OPTICAL COMPANY

By American Optical

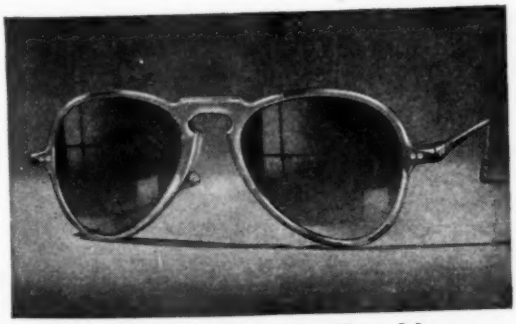
TUNE OUT THE SUN

With AO Calobar

AO Calobar approved for U. S. Army Flyers.



Fits-ons also for those who prefer this style.



AO Calobar available in attractive zyl frames.

Company . . . .

EDITORIAL NOTICE TO CONTRIBUTORS

The American Journal of Optometry is a monthly journal, published in annual volumes of about six hundred pages of reading matter each, illustrated where necessary, by cuts in the text.

About one-half of the space is devoted to technical articles, and the remaining half is given over to CURRENT COMMENTS, technical editorials, abstracts and book reviews, all of them original.

The papers and reports are original and are accepted only with the understanding that they are to be published in this journal exclusively.

The editors of the American Journal of Optometry beg to offer the following suggestions to authors who propose to favor them with the publication of their contributions.

I. Write on one side of the paper. Double-spaced, typewritten MS. is preferred.

II. Words to be printed in *italics* should be underscored once, in SMALL CAPS twice, and in LARGE CAPITALS three times. **Antique type** when called for should be so marked.

III. Be sure that the title of your paper indicates its contents. Should the subject be a general one, for instance, Case Reports, it would be well to mention the subject of each special report—for instance: Case One. Progressive Myopia with Exophoria. Case 2. Divergent Squint with Amblyopia. These special titles will appear in the table of contents of each number.

IV. Illustrations should be carefully drawn on separate sheets.

V. When authors receive proofs for revision, they should correct and return these without delay. We beg, however, to remind our contributors that changes in the manuscript necessitates resetting, this causing much additional expense, so we ask that alterations be limited to what is of essential importance.

VI. Because of the added cost, we have discontinued the giving of gratuitous reprints to our authors, but we will supply them with these at the cost of press work and paper where so desired. The following tables of charges will apply for the year 1940.

Number of Reprints	Number of Pages in Reprint					
	4	8*	12*	16*	20*	24*
100	$4.70	$10.50	$12.65	$14.85	$17.05	$19.80
250	7.70	17.05	20.35	22.80	24.50	29.45
500	12.40	26.95	31.35	34.65	36.85	44.00

Prices for greater numbers furnished on request. Orders for reprints should be placed at the head of the manuscript, or should at the latest reach us before the Journal has gone to press.

When sending manuscripts to the American Journal of Optometry, please address the editor: Dr. Carel C. Koch, 1501-1504 Foshay Tower, Minneapolis, Minn.

---

*Unless otherwise ordered, reprints with 8 or more pages are furnished with heavy paper covers on which is printed the title of the paper and the author's name. All reprints shipped F. O. B. Minneapolis, Minn.

AMERICAN JOURNAL OF OPTOMETRY

Vol. 17 JUNE, 1940 No. 6

SOME FACTORS IN HUMAN MEASUREMENT*

C. A. Whitmer, Ph.D.
Pittsburgh, Pa.

For the sake of preventing any misunderstanding and as a defense against being labeled a destructive critic I shall first make my position clear. I am personally concerned with the measurement and analysis of human traits and processes and the application of guidance and corrective techniques where they are indicated. That is my profession. Whatever I have to say about measurements or the measurer applies to the methods and to the workers in my field as well as in yours. I am concerned because we, the psychologists, have frequently been criticized because we have attempted, in the words of the critics, "to reduce the complexities of human behavior and the soul to mathematical concepts." Although this criticism might conceivably be true of the statistical and clinical psychologist it is probably less true of the optometrists. Upon second thought, it might be increasingly true of many of you also since you are becoming more concerned with seeing as a human process rather than correction of vision as a mechanical process. As you become more concerned with the everyday functional behavior of the child's visual processes and the consequent effects upon his behavior you are increasingly subject to the pitfalls which beset the psychologist. We welcome you to consider these most vital of human problems and feel that with your assistance we can be of greater service to the child. In every way possible we want you to profit by our mistakes and by our successes. So what I have to say this morning will not be destructive criticism but might better be considered as a description of some of the ghosts of our past and some of the dilemmas of our present practices which we hope will not hinder your progress.

---

*An abridgment of the material presented before the Middle Atlantic Optometric Congress in Pittsburgh. Submitted for publication April 8, 1940.

First let us consider the concept of measurement as applied to human behavior. You may ask "what difference does such theory make?" The answer is that it has led to many misinterpretations of what we have done. In strict usage the term measurement belongs to the exact sciences. In exact scientific measurement the units used as measures are equal. In exact measurement there are two ways of measuring: the direct way and the indirect way. Let me illustrate: If we had a coil of wire of a certain gauge we could measure it by unwinding it and applying a meter stick. That would be direct measurement. We could also measure the wire by cutting off a sample, weighing it, measuring it and with the known length of the total coil the measurement could be accomplished by computing the proportion of weight to linear measure of the sample. This would be indirect measurement. In the so-called measurement of human processes we can, in fact, use neither of these methods used in physical measurement. In the first place, we can never "uncoil" the whole sample of human behavior or process in order to bring it entirely under our immediate scrutiny. Even if that impossible feat could be performed we would still lack a measuring instrument with equal units. We are limited to indirect measurement of samples of behavior. It then becomes pertinent to ask ourselves "How true are our samples?" That is with reference to the coil of wire, does the gauge in the sample remain constant throughout the whole coil? With reference to a sample of behavior the answer is, only relatively so. Our only present way of dealing with this problem is to take large numbers of samples, treat them statistically and derive a scale of units of difficulty or speed which seems statistically justifiable. Generalizations based upon poor samples or too few samples become obviously precarious.

If we are strictly honest with ourselves I believe we must admit that we cannot actually *measure* any human behavior or process. The person who confuses techniques of measurement in the physical sciences with measurement of human behavior is only deceiving himself. If he places unquestioning dependence in the results of his measurement he surely must some time suffer a rude awakening.

To me it seems much more logical that we should think of our so-called measures of human behavior as being more telescopic rather than metric. Without knowing the exact magnifying power of your binoculars you can learn a lot more about the individual player in a football game or about the nesting habits of your favorite song bird than you could learn by looking at them without binoculars. You might make

many measurements of the football player or of the bird and describe them in very exact metric terms but still know very little about their real life behavior. If we used our psychological measures as means of getting a better view of the individual rather than putting so much emphasis on the metric aspect of the test results I feel sure that those results would be more meaningful. That does not mean that we should abandon all attempts to develop metric standards but rather that we place the emphasis on understanding rather than on figures. With our statistical concepts of averages and norms and distribution of traits and a better description of the details of the behavior we can defend and profit by our techniques. If we abandon the unquestioning faith in the exactness of our measures of human processes and consider our test results as indices with an admitted margin of error we will remain in a favorable position to make progress in understanding human behavior.

The writer's aim in this paper is to point out some of the statistical concepts and sources of error which should make us more appreciative of the value and limitations of our indices of human behavior. When we deal with human behavior it behooves us to remember that we are dealing with living, dynamic patients rather than inanimate, static material. I believe that too many of us get interested and intrigued with the mechanical aspects of our techniques and lose sight of the fact that we are dealing with people. It has been said that the physician who treats the disease and neglects the patient is in the oft mentioned dilemma of having his view of the forest obscured by his being too close to the trees. Any of us who work with human behavior must strive to keep his perspective with respect to the qualitative and quantitative aspects of his techniques.

One of the qualifications or factors which we must constantly consider in the measurement of human behavior is that of reliability of our tests. By reliability we mean the consistency with which our test functions. Does its administration give us the same results today that would have been obtained yesterday or that would be procured tomorrow. A standardized test is justifiably called standardized and is worthy of use only if its margin of error in estimate is verified and stated in an acceptable statistical statement. Obviously, practice with the material of the test or growth in whatever traits it measures must be controlled or taken into account in the test results. Experience with the material of the test often-times interferes with the reliability of test results. During the past year, long accepted practices in mental measurement have had their relia-

bility challenged by some who appear to desire publicity and seem to have been carried away by their own enthusiasm. I refer to the reliability of the results of individual mental tests questioned by some of the psychologists at the University of Iowa. Undoubtedly there are among us some psychologists who have failed to differentiate between the concepts of exact measurement and that of a serviceable index. Extreme positions are difficult to defend and the heatedness of the argument only serves to make the careful worker more appreciative of the factors which must be considered in human measurement. Statistical reliabilities are often-times misinterpreted because they indicate a reliability much above chance. But we must remember that statistical reliabilities are also statements implying something less than complete or perfect reliability. The true scientist will consider the chances of *unreliability* as well as the chances of *reliability*. Our enthusiasm in having our previous convictions borne out by test results should never obscure the amount of unreliability in the measurement of human behavior.

Another important factor in human measurement is the validity of the measure. Reliable tests are not necessarily valid. That is, just because a test measures something consistently it does not necessarily measure what it is supposed to measure. Validity is defined as the accuracy with which the test measures what it is named or purports to measure. If an intelligence test is valid it measures intelligence. If it includes a measure of reading ability it is not a measure of the intelligence of the non-reader. If it includes a measure of fatigue it is not a valid measure of intelligence. The Snellen chart is still a commonly accepted procedure used to check the vision of school children. I have seen records of children for whom a normal Snellen record has been recorded when I determined positively that the child could not read letters. On other records I have seen failures on Snellen tests when I knew the child could not read letters. The Snellen test may act as a means of determining whether or not the child can read letters. By that token its validity as a measure of vision is open to serious question unless the child knows the letters by name.

A statistical statement of the validity of a test is usually offered by the maker of the test. Unless there is demonstrated proof of validity the test is open to serious question at least until such proof is established. Validity is usually stated by a coefficient of correlation between the test in question and some criterion. The criterion should be an actual existence of the trait to be measured or else the test held against it would not be proven valid even though its relation to the criterion were very

close. Use of any test with questionable proof of validity puts a burden upon the one who attempts to interpret the results because the chances of error in interpretation is greater. Even though the validity of a test is high the user of the test must remember that validity holds only when the test is applied to a subject who is representative of the subjects in the standardization group. That is to say that the test may be valid for some individuals but not for others.

Proof of validity has been one of the most troublesome aspects of human measurement. Human behavior is so complex and is affected by so many variables that it is ofen-times very difficult to establish a criterion against which a test may be validated. Empirical proof of validity is often desirable even though correlation with a criterion has been successfully made. Time and the control group method have often proved serviceable in the proof of validity of a test. Medical practice being one of the older techniques of dealing with a phase of human behavior, offers some very interesting examples of the development of validity of tests and treatments. Light shining through blue glass was at one time considered a cure for certain diseases. It was only time and control cases which proved the lack of validity of such treatment. The ways of science are devious and slow. Ambitious manufacturers interested in selling instruments and enthusiastic inventors of tests often-times take advantage of human gullibility and desire for quick cures. Probably the true difference between the scientist and the quack is the fact that the true scientist and careful practitioner use valid methods and recognizes the limitations of the methods which he does use. I emphasize the practical limitations of the validity criteria offered by many tests because there are practically no perfectly valid tests of human processes and behavior. I consider the recognition of the limitations of the validity of his technique a mark of the expert. The true expert knows his own limitations for, truly a little knowledge may be a dangerous qualification when one deals with human behavior.

In our generation we have gone through a fad of mechanical development. The emphasis on machine methods has influenced the professions dealing with human behavior in the direction of a struggle for objectivity. We want to do everything with machine like precision. In psychology we have self-administered tests and machine scored tests. We think that we appear to be more scientific when the test can be given by anyone who can count time on a stop watch and read the score off a scoring machine tape. The presumption is that that score quantifies an intelli-

gence. In optometry you have precision instruments so that you reduce seeing or perception to mathematical units. We feel ill, go to a medical clinic, go through a series of tests, get a prescription and by taking it are supposed to become sound in body. The child goes to school in a large class for a period of time, is scored on objective tests, gets a certificate of credits and is educated—or is he? Maybe there is just enough truth in this mechanical handling of human behavior to help us to deceive ourselves. I sometimes wonder if we are doing a lot of wishful thinking. I have a very good friend in the medical profession with whom I philosophize about these matters and we usually arrive at the decision that there is no substitute for a judicious use of subjective judgment based upon experience. None of us would recommend that we discard all our tests and instruments because they have obviously helped us to progress in dealing with human ills. But we might all profitably check up on ourselves to see that we are not ignoring something of value when we try to categorize human behavior by reducing it all to machine scores. The well trained expert will know the objective mechanical methods and will use them for all that they are worth but he will not neglect the subjective, qualitative observations because he will realize that no mechanical methods of dealing with human behavior can be perfectly valid.

Let us consider some of the particular sources of error which may affect the general consideration of reliability, validity and objectivity of our tests. First, there are the errors which may occur because of the imperfections in the tests themselves. The units of the test may not be perfectly satisfactory for the behavior which they measure. For example, in any series of responses graded according to difficulty each successive step towards the most difficult response becomes increasingly greater from the standpoint of relative difficulty. The relative difficulty may increase by geometric ratio although the units are stated in numerical ratio. For example, the score on visual coordination level is listed on the Keystone Telebinocular record as per cent correct. That is if the subject gets as high as the 7th line his score is 70 per cent. Does a response of 50% correct represent just half of the ability represented by the 100 per cent score? Not necessarily so. The actual difference in ratio of difficulty may be 1:10 instead of 5:10. In this case a critical score, that is a score found to be necessary for certain other visual performances is the criterion of interpretation. An interpretation based upon relative difficulty would be erroneous. The point is that in interpreting a score we should know the basis of its interpretation. An uninterpreted score is useless—a misinterpreted score may actually be vicious.

A second source of error in tests of human behavior is in the mistakes occurring because the examiner misinterprets the response. Probably all of you have had some experience with a teacher who took your answers "out of your mouth" so to speak. If you made any attempt to answer a question the meaning or interpretation of your answer was turned into what the teacher interpreted it to be, not at all what you intended it to be. The examiner is likely to have a mental set and it is often difficult to keep that mental set from determining the interpretation of the response. We find it very easy to see what we are looking for in the response. The objective test demands a certain specific response which leaves no margin of error in the interpretation of the response but the test which allows the subject to respond in his own words or in his own way often leaves the way open for the examiner to interpret the response according to his own mental set. The responses of the test should be divided into qualitative and quantitative parts and those parts should be kept separate as a matter of record so that if the examiner himself or another person deals with them at a later time it will be possible to determine what part is test result and what part is examiner's impression of the performance.

A third source of error is in the fluctuation of response due to intrinsic conditions within the subject. Human behavior is dynamic, that is to say, that it is not entirely controlled by external stimuli. John B. Watson tried to build a system of psychology based upon the hypothesis that all behavior is a product of mechanically controlled stimuli. Very few psychologists would attempt to defend such an hypothesis. The psychologist who works in an attempt to bring to light the hereditary and environmental elements influencing his problem soon learns that there are responses which seem to be products of other combinations of responses. You decide to go to a meeting; you decide to wear certain particular clothing rather than other possible garments. Each of us is an individual and although we are all more or less alike we are still different. Some of us are different enough that we are called queer. If the differentness and inconsistency of behavior are emphasized we might be considered somewhat unstable. You may have heard of the book by a contemporary psychiatrist entitled "Be Glad You Are Neurotic." I am not ready to advocate neuroticism but I am sure that we must admit its existence as an intrinsic aspect of human behavior. The neurotic individual is a little less predictable than most of us are. His responses are seemingly not a logical result of his stimulating environment. These variations of behavior are normal and are frequently met by any one who deals with

the problems of human behavior. By the use of some such terms as emotional instability, interest, motivation or attention we avoid an attempt to explain or understand the behavior which does not seem logical. Naive acceptance of test results without consideration of the stability of the subject's behavior must invariably lead to misunderstanding of those results.

The adult subject may appreciate the implications of the test and may be vitally interested in the results. When adults come voluntarily for tests because they feel that they have a problem there is likely to be relatively little error of response due to intrinsic factors. Not so, however, in the case of the child. He is brought to the expert for the test, he is usually not much interested and hence his attention must be attracted. He must be motivated. Unfortunately, he may and often does have an emotionally colored mental set against any one called a "doctor." These intrinsic factors are important in the fact that they frequently interfere with the validity of our test results through the medium of these errors. We should do everyhing possible to limit the occurrence of these errors and must constantly be on guard to interpret our test results with due consideration of the consequences of error. The makers of tests and testing instruments have exercised great ingenuity in constructing modern testing devices in such a way that they interest the child and provide motivation. The game situation, pictures attractive to children, language that they can understand and appropriate settings for tests have all been exploited to insure better intrinsic conditions of response. If we add to these a sympathetic and understanding examiner we will undoubtedly avoid many response errors. Certainly marked improvement in these factors has been made in the past decade. In spite of all that we do to control the effect of intrinsic factors we will still have to cope now and again with the individual who does not react normally to the conditions of the tests. The skilled examiner should be able to recognize such responses and must be prepared to deal with them accordingly by repeated examination or by changing his regular routine of examination or manner of handling the patient so that the source of error will be reduced.

In conclusion I want to consider some general concepts which may influence our interpretation of test results. First let us consider the concept of causation with reference to human behavior. We are very prone to simplify cause-effect relationship by attributing some units of behavior to single causal events. Often-times intrinsic, underlying causes are confused with precipitating events. An example which touches our own fields of work jointly is the statement that imperfect vision causes read-

ing disabilities. I would not deny the correctness of that statement in some cases but in many cases where there is visual defect and reading disability the two conditions may be only remotely connected if they are at all related. Reading is a complex behavior which depends upon many factors including physiological age, information, ability to perceive form, correct practice, etc. In some cases certain of these factors or even a combination of them, including poor vision, do *not* prevent the child from learning to read. We may, then, justifiably raise the question of what are causes of reading disability. The true answer would be that we probably do not know in many cases. Some have even used the term "aphasia" to cloak their ignorance when the causes are very obscure and ordinary methods of treatment and teaching fail. Interestingly enough a generation ago the non-reader was generally called aphasic. With improvement of techniques of analysis and better methods of treatment and training many so-called asphasics have become readers. What then do the results of our tests actually tell us? Causes? Not necessarily. The answer is concomitants or associated factors. The true cause may have been the basis for the whole constellation of deficiencies including the reading deficiency.

We use hypotheses or theories to relate our test findings to the conditions of the subject and the treatment of the disability. If our treatment effects a cure does that prove the hypothesis? Not necessarily—probably few of you will agree that faith cures prove that lack of faith was the cause of the disease. The fact of this dilemma does not imply that we cease our methods of treatment which effect cures or that we abandon our hypotheses concerning the cause of the disabilities. We should, however, understand that what we are probably doing with our treatment is aiding the natural dynamic organism to operate with a higher degree of efficiency. We are not changing the organism but only aiding it to overcome some lack of balance.

In closing may we repeat that the truly scientific practitioner knows the available techniques in his profession and can evaluate his test results; he realizes the complexity of the human organism; he constantly revises his hypotheses as newer information and further experimentation justifies and he never forgets that a judicious use of common sense can never be replaced by purely mechanical solutions of human problems.

DR. CARROLL A. WHITMER
UNIVERSITY OF PITTSBURGH
PITTSBURGH, PA.

MEASUREMENT OF THE ANGLE OF SQUINT BY MEANS OF THE OPTHALMOGRAPH*

W. A. Meyer, Jr., O.D.
Sacramento, California

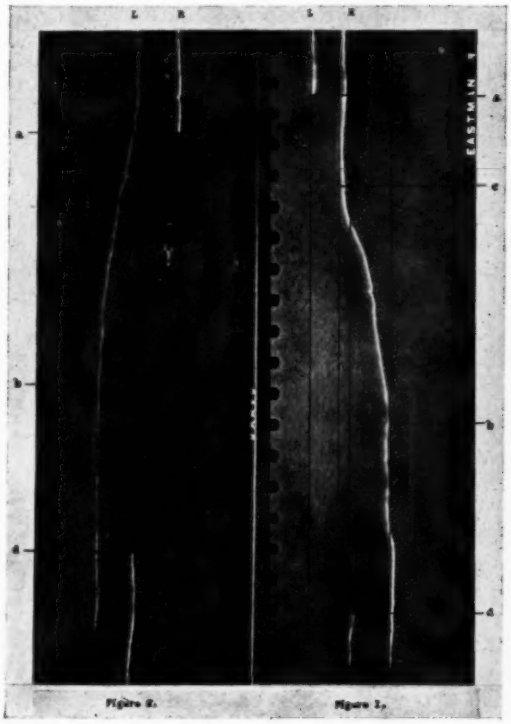
Measurement of the angle of squint is a problem which all practitioners have found troublesome. Those cases in which vertical diplopia can be produced are easily handled by the classical methods. However, in all cases in which a true alternating or concomitant strabismus of long standing exists, diplopia cannot be produced. Such cases yield readily to measurement by the use of the opthalmograph. Squints of any type wherein fixation can be maintained by either eye alternately, while not demanding photographic measurement, are simplified by this procedure.

Reference to Figures 1 and 2 will illustrate the method used for these measurements. These are enlargements from portions of an opthalmographic film taken from a case of true alternating strabismus. Figure 1 shows at (a) the left eye fixating a target with the right eye deviating temple-ward. At this point the left eye was occluded in such a manner as to not only prevent fixation but to eliminate the reflex image which is used for the photography. This is done with a card held between the head frame of the instrument and the camera. For this reason the line representing the left eye ceases at this point. From (a) to (c) the right eye continued to deviate temple-ward starting to take up fixation at (c) and gaining central fixation at (b). At (d) the left eye was again uncovered. During the period of occlusion the left eye had deviated temple-ward by an amount approximating the angle of squint assumed by the right eye. Figure 2 is the same reaction with the eyes reversed. These graphs are not made in the usual manner but rather the instrument has been focused so that the right eye is represented on the left side of the film, and the left on the right. This crossing of the images produces a condition *on the print* which is reversed both as to right and left and the motions of the individual tracks relative to the usual opthalmograph. Thus a narrowing of the stairways represents a convergence, and

*Submitted for publication April 3, 1940.

an expansion represents a divergence. This deviation from the conventional procedure has as its advantages both ease of interpretation and assistance in retaining the images on the film strip where a high angular deviation exists.

Previous investigations have shown that an excursion of a millimeter on the original film represents an angular rotation of approximately 5△. Since in our office records an enlargement of 2.4 X is used, an excursion of one millimeter will represent approximately 2.08△. Since the compensatory motion measures approximately 15 (Fig. 2) millimeters the angular deviation must have been 31△. There is a difference between Figure 1 and Figure 2 in this respect (△d = 4mm), undoubtedly due to the fact that this girl normally fixates with the left eye. Referring again to Figure 1, in the (a) position, with the left eye fixing, the distance between the two tracks is 10mm. In the (d) position, with the right eye fixing, the distance is 15mm, which would indicate that when the left eye is the fixing eye, the divergent squint is more pronounced by 5 X 2.08 = 10.4△.



An interesting illustration of the facility with which this girl takes up fixation with the left eye is made by a comparison of the two figures. Note that on Figure 2 occlusion of the right eye was immediately followed by fixative motions of the left eye, whereas on Figure 1 a considerable time elapsed between occlusion of the left eye and the start of fixation by the right eye. This can be evaluated from the speed of motion of the film through the camera, which *on these photographs* is 1.2 inches per second. On this basis the time interval represented by the distance from (a) to (c) Fig. 1 equals 1.08 seconds, and (c) to (b) 2.83 seconds. On Figure 2, (a) to (b) equals 3.0 seconds.

Remedial work with cases of strabismus usually will show better results if treatment is directed at that reaction which is most difficult. Obviously procedures of treatment which require fixative motions of the right eye on the above case involve greater effort on the part of the patient.

This method of measurement can be beneficially applied to those types of strabismus which I prefer to classify as compensatory squints, this classification to include all cases where the squint is manifest as a compensation for a fusional inability, or where the angle of deviation is increased by measurement methods. I have found a number of cases where the prism power necessary to align the images viewed through a vertical dissociating prism would approximate 40△. These same cases, when measured photographically, would demonstrate an angular deviation of perhaps only 12△. Qualitative observations have convinced me that this change is a progressive compensatory motion induced by the measuring prism. Thus it can be reasoned that the angle of squint measured by the classical dissociation method is not a squint at all, but rather the squint plus the rotational ability of that particular eye. Obviously a quantitative evaluation of strabismus made by dissociation methods bears no relation to the true strabismus which might exist. However, measurement with the Opthalmograph, as outlined above, gives a measure of the actual deviation during normal fixation so that the quantitative measure assigned to a particular squint will be the actual deviation habitually manifest.

DR. WILLIAM A. MEYER, JR.
903 K. STREET
SACRAMENTO, CALIF.

ANISEIKONIA*

K. B. Stoddard, Ph.D.
University of California
Berkeley, California

Introduction and General Discussion

Until comparatively recent years little has been added to the basic concepts laid down by von Helmholtz, Hering, Vieth, Müller and Brewster—masters of another era—in the field of psychological optics known as space perception. This field is intimately concerned with the why and how of the subjective interpretation of external space. In such interpretation, if the visual experience results from monocular perception, then one is concerned mainly with perspective. If the experience results from binocular use of the eyes, then one has in addition to perspective the phenomena of stereoscopic vision.

Recently new information has been added to our knowledge in this field of space perception mainly by two schools. One of these is the school of the physiologist Tschermak—a student of Hering—at the German University of Prague in what was formerly Czechoslovakia; the other the Dartmouth Eye Institute under Ames, Gliddon and Bielschowsky. Last summer it was my privilege to be sent by Professor Minor to study in this field at the Dartmouth Eye Institute.

Of the many phases of space perception under investigation at Dartmouth I wish to confine the discussion to the field most intimately associated with the Dartmouth school, namely, Aniseikonia.

The term is applied to a phenomenon quite well known in physiological optics with which you are all familiar; namely, the object, as seen by the two eyes, to have a different size. In routine refraction, as you know, many times the patient says the object is larger as seen with one eye than it is with the other. Attempts to correct this with power lenses have always been unsatisfactory.

*An abridgment of the material presented before the California State Association of Optometrists at San Francisco, California, February 24, 1940. Submitted for publication March 11, 1940.

Historically, this phenomenon has great antiquity. Desaguliers in 1717 pointed out that in asymmetric convergence there should be an unequal size in the images because the object viewed was more distant from one eye than from the other. Wheatstone in 1838 made use of this concept to explain certain phenomena in stereoscopic vision. The possibility that unequal sized ocular images could occur in both corrected and uncorrected anisometropia or antimetropia was considered by both Donders in 1864 and Hess in 1905. All of these investigators thought the phenomenon to result from purely physical causes; for example, unequal refractive power in the two eyes, or equal refractive power in each eye and differing object distances, or a combination of both. A marked example of the former type of aniseikonia occurs in unilateral aphakia where differences in image size may be as high as 25%. Von Rohr and Stock in 1913 mentioned a telescopic spectacle to overcome aniseikonia of this type. It, however, was of very limited use because of a very constricted field of view.

Apparently Erggelet in 1916 was the first to consider the possibility that some types of aniseikonia might be physiological in origin and not physical. Since then, of course, it has been realized that the physiological basis for aniseikonia may be the most important one in many cases.

It would be well to consider at this point the various factors that could cause an unequal size in the ocular images. First of all, since the whole phenomenon is subjective, one deals only with the visual experience that reaches the conscious level. That is to say, one cannot a priori assign an aniseikonia to a specific link in the (physical—physiological —psychological) chain from object to visual cortex. However, any asymmetry existing in the chain between object and visual cortex can and probably does produce an aniseikonia to some extent.

Presumably then, a difference in object distance for two eyes of equal refractive power could cause aniseikonia. Unequal refractive power could cause aniseikonia. Unequal spatial distribution of the retinal end-organs in the two eyes could cause aniseikonia, unequal spatial representation of each retina in cortical areas could cause aniseikonia, and of course any combination of these could also cause aniseikonia.

When one considers the lack of symmetry inherent in the human body one wonders why there is not a great deal of aniseikonia existing

in the world. As a matter of fact, it is a very prevalent anomaly. Fortunately, for most people there is an ample ability to compensate for the image inequality.

I shall use the term *unequal ocular images* repeatedly—as it is used at Dartmouth—to describe the inequality in the visual images reaching the conscious level from the same object by the two eyes.

It should be clear from the foregoing that the concept of unequal ocular images is not new, nor is it especially unique. It has been thought that in order to cause difficulty the size difference must be fairly large, say from 5% to 25%, differences that occur in marked antimetropia and in unilateral aphakia. The main contribution of the Dartmouth group—aside from the development of precise methods to measure aniseikonia—has been the demonstrating of the clinical importance of size differences of the order of a few per cent. The very fact that the size differences considered have been so small has been the cause of the indifference with which the whole subject has been received by both ophthalmologists and optometrists. The only way that such indifference can be overcome and the true importance of such work realized is by the gradual compilation of a large number of clinical cases to eliminate all doubt. This has been done during the past ten years by the Dartmouth group so that today the entire field of aniseikonia has almost unanimous approval.

Methods of Measurement

There are several methods of measurement of aniseikonia practically all of which have been developed by the Dartmouth group. In all of these methods a careful refraction is the starting point for the measurement for aniseikonia. Especially important is the balancing of the two eyes. That is to say overcorrection or undercorrection of both eyes by the same amount is not as important an error, as is the over or undercorrection of one eye relative to the other. At Dartmouth the basic refraction prior to the measurement of aniseikonia is a haploscopic refraction in which the point conjugate to the retina is accurately determined by statistical average. Even astigma is measured in this manner. Final checks are made by usual refractive procedures.

The first, and at the present time still the most accurate method of measuring aniseikonia may be called the *method of direct comparison.* This method consists essentially of the comparison of a given linear

extent by the two eyes. The most modern development of this method is the following.

An object is projected on an aluminized screen to give a fixation target. In this target the odd-numbered arrows are polarized in one direction and the even-numbered arrows are polarized at right angles to this. Polaroid plano lenses are placed in front of each eye, so that the odd-numbered arrows are visible only to the right eye, and the even-numbered arrows are visible only to the left eye. The rest of the target is unpolarized and visible to both eyes. A portion of the target acts as a fusional object in the peripheral retina.

In using this target the procedure is as follows: the patient is asked to look first at the fusional area and then to the arrows 1 and 2. The patient is asked which arrow is higher, arrow 1 or arrow 2. The patient is then asked to look again at the fusional area and then to arrows 3 and 4. The patient is asked which arrow is higher, arrow 3 or arrow 4. As an example, let us say that arrow 1 is higher than arrow 2, and arrow 3 lower than arrow 4. Then since the odd-numbered arrows are seen with the right eye, the object as seen by the right eye is larger than that seen by the left eye, in the vertical meridian. A similar measurement is made in the horizontal meridian to ascertain which image is larger. Lenses that magnify but have no significant power—for practical purposes no power—are used to magnify the smaller image to equivalence with the larger one.

In the instrument developed by Dartmouth, the ophthalmo-eikonometer, the magnifying lenses are magnifying doublets like an opera glass, a plus lens—minus lens combination. These lens combinations are of two types. One combination magnifies the smaller image equally in all meridians, and the other type magnifies in one meridian only. This measurement is described very briefly here. It should not be inferred that the procedure outlined is one of merely increasing the magnification until the two images appear to be of the same size. There is a so-called aniseikonic amplitude or range of magnification in which the images seem to be of the same size. In cases of marked aniseikonia this range may be large, and a statistical method of measurement is necessary to determine its limits, before a measure of the aniseikonia present can be made. After the aniseikonia has been corrected for a time, this range is reduced, so that more accurate measurements can be made at a subsequent period. The point to be made here is that while in theory the measurement is simple, the actual measurement of aniseikonia

may be very laborious and time-consuming indeed. It may take from several hours to several days to make sufficiently good measurements, depending upon the patient. Various difficulties are usually encountered such as poor peripheral fusion, suppression—particularly macular suppression—uncertainty in observation, low intelligence on the part of the patient, and so forth. It should be emphasized that an examination for aniseikonia, which is entirely a subjective examination, requires close attention on the part of the patient as well as a fair degree of intelligence.

Another method that can be used makes use of the determination of the longitudinal horopter. This method is confined to size differences existing in the horizontal meridian. It may be said that in the method of direct comparisons the vertical measurements can usually be made with a great accuracy because in the horizontal meridian the phenomenon of retinal slip, or fixation disparity, complicates the measurement. If further information concerning the horizontal size difference can be obtained by another method, the final estimate of the aniseikonia will be more exact.

The horopter can be defined as the locus in space of all points that are conjugate to corresponding retinal points for a given fixation. Theoretically, the longitudinal horopter is a circle passing through the point of fixation and the two ocular nodal points, for fixations along the median line. This is the so-called Vieth-Müller circle. Actually, experiment usually shows quite a departure from this theoretical position. The departure is usually referred to as the Hering-Hillebrande deviation. This deviation is probably due to, among other things, the fact that instead of true point to point retinal correspondence, a point to area, or area to area correspondence between the retinas exists; otherwise the phenomena of single binocular vision with depth perception could not occur. This fusional area in one retina that corresponds to a point on the other retina is called Panum's Area.

Experimentally the longitudinal horopter is determined by setting a series of vertical rods which move on guides or rails arranged in a fan-like manner from the cyclopean eye until, while the central rod is fixated bifoveally, the others appear to be single. The central rod is fixated bifoveally and the other rods are set, using peripheral vision. Since as Panum has shown for any point in one retina there is a corresponding fusinal area in the other, there will be a range along each rail that any rod may be set and still appear singly. In order to obviate

this one makes use of a more precisely defined horopter, the so-called apparent frontal plane horopter in which all the rods not only appear single, but also appear to be in a plane equi-distant from the eyes. If one places a magnifying lens before one of the two eyes, one observes a rotation of this apparent frontal plane horopter about a vertical axis through the point of fixation. This rotation is toward the eye with the larger image and the amount of rotation is about 4° for each 1% increase in magnification.

These criteria can be used to measure aniseikonia because, if a person has aniseikonia in the horizontal meridian, the apparent frontal plane horopter will be rotated toward the eye with the larger image instead of lying in the frontal plane. The amount of rotation is directly proportional to the aniseikonia.

These phenomena have led to the development of a more compact and usable piece of apparatus called the tilting plane. It evolved directly from the horopter observations described above. It consists essentially of a glass plate, about a foot square, upon which many small ink spots are sprayed. This plane, which constitutes a true frontal plane when in a plane perpendicular to the median line, can rotate about a vertical axis through the point of fixation. If one now places a lens which magnifies in the horizontal meridian only, before the right eye, the plane when actually occupying the true frontal plane, appears to be rotated away from the right eye. In order for the patient to place this plane so that it appears to occupy the frontal plane when viewed through the lens, rotation of the glass plate towards the right eye is necessary. This phenomenon is known as the geometric size effect. The amount of rotation necessary is directly proportional to the difference in size in the horizontal meridian. Thus, if a patient has unequal sized ocular images the position of the plane, when it appears to him to be in the frontal plane can be used to measure the aniseikonia in the horizontal meridian.

So far no consideration of the image size condition in the vertical meridian has been made in the use of this method. Several years ago, Professor Ogle of Dartmouth discovered a phenomenon for which no true explanation exists at present. This is called the induced size effect. When a magnifying lens is placed in front of the right eye such that it magnifies only in the vertical meridian, the tilting plane must be rotated in such a direction to bring it into the frontal plane, as if the magnifica-

tion had been placed in the horizontal meridian of the left eye. In other words, the rotation is just opposite to what it would have been if the magnification had been in the horizontal meridian of the right eye. Whereas the rotation in the geometric size effect is directly proportional to the magnification, in the induced size effect it is not proportional to the size difference for all degrees of magnification. Nevertheless, the combination of these two effects can be used to measure fairly accurately the aniseikonia present.

A somewhat different method of measuring aniseikonia is being developed at the Optometry Department of the University of California in which the direct method of comparison is used, but in which no size lenses are necessary. This method utilizes a target similar to one used at Dartmouth and differs only in that the distance between the arrows may be changed mechanically instead of optically. At present, tests of an experimental model are under way. It is hoped that this may develop into an instrument that can be used by the optometrist to evaluate approximately the aniseikonia present so that intelligent referal to an aniseikonic clinic can be made.

Types of Aniseikonia

So far no mention has been made of the various types of size differences that can and probably do exist. First to be mentioned is, of course, the overall size difference in which the ocular image resulting from one eye is uniformly larger than that from the other eye. Then there is the meridional size difference in which, in one meridian the two ocular images are of the same size, and in a meridian usually 90 degrees from the initial one, the two images have a different size. The usual clinical case is a combination of these two types. Other transitional types, of course, immediately occur to one. It should be noted that the only ones measurable clinically at present, are overall and meridional size differences of uniform type. The type of size difference that is non-uniform such as occurs with a plano prism, cannot be measured exactly at present. As a matter of fact, the bending of external space observed through prisms base-out or base-in results from the induced aniseikonia. Other non-symmetrical types can neither be measured nor corrected at present.

Clinically, the most important types are combinations of the overall and meridional size differences. They may not be confined to rectilinear axes but may take an oblique position.

The above types of aniseikonia are what might be considered as anatomic types. They are static and occur for normal fixations in the median plane. There are, however, induced types of aniseikonia that result functionally and temporarily, in other normal and abnormal uses of the eyes. One of these types I have mentioned above in connection with the induced size effect. That is, increased magnification in the vertical meridian of one eye results in a functional aniseikonia in the horizontal meridian of the other eye.

Another type is the aniseikonia that results in asymmetric convergence of the eyes. If one looks laterally at an object, the fact that the object is more distant from one eye than the other should result in a difference in ocular image size. The image seen by the eye from which the object is most distant, should be smaller. Strangely enough to a first approximation the images are of the same size. This is almost exactly true of the vertical meridian but less exactly so in the horizontal meridian. From purely geometric considerations the size difference of retinal images must occur, but apparently there is a functional ability on the part of some portion of the seeing apparatus to induce an aniseikonia of the opposite type, in order to compensate for this geometric size difference. One can make use of a haploscope—a sort of modified Brewster stereoscope on the principle of the anblyoscope—so that the objects seen are always at the same distance from the eyes to demonstrate this phenomenon. If this can be done, and the instrument set for asymmetric convergence the image seen by the adducting eye is materially larger than that seen by the abducting eye. This occurs even though the two targets are of the same size and equi-distant from the two eyes. This induced aniseikonia is of such magnitude as to neutralize to a first approximation that resulting from the geometric positioning in asymmetric convergence. This compensatory change is functional, and presumably is central in origin, although the possibility of retinal stretch or distortion in adduction as well as asymmetrical changes in the refractive state of the eye must be considered.

There are many phases of aniseikonia in which the surface has only been scratched. The static type of aniseikonia is more or less obvious. In the latter type or non-static, or functional aniseikonia, little or nothing is known of the mechanism producing it.

Aniseikonic Lenses

The lenses used to correct aniseikonia are, of course, lenses that give magnification with a negligible amount of refractive power. Ideally

they should have no power at all. They are made on the principle of an afocal refractive system like the opera glass. The opera glass is a plus lens ⌒ minus lens system of zero power. Most aniseikonic, iseikonic, or size lenses are merely an opera glass of very small magnification. Instead of magnifying 6x or 8x (600 or 800%) they magnify only a few per cent such as 2%, 6% or 20%. For such small magnifications as these a single piece of glass suffices: the front surface having a convex surface and the back, a concave surface. Correct choice of front and back surface powers and lens thickness results in a given magnification with no power for a given fixation distance. Essentially, the lens is merely a flat sheet of glass bent to the proper curvature. The meridional size lens is almost exactly of this type.

The simple size lens is rather easily calculated, but when a spherical and astigmatic power is to be ground along with the aniseikonic correction, the resulting lens calculation and grinding is very complicated. Many times it is necessary for the final prescription to be made up in two lenses that usually go into a single eye wire.

It might be added parenthetically at this point, that a person must have to derive a great deal of comfort and added efficiency to wear one of these aniseikonic lenses as they are very undesirable from a cosmetic point of view.

Objective Effects of Aniseikonia

While most of the effects of aniseikonia result in subjective symptoms and disorders, there are a number of objective effects as well. Most of these objective symptoms are associated with distortions in binocular space perception, similar to those described above in the material on the horopter and frontal plane. In aviation, apparently there has been considerable difficulty with student and even veteran pilots who persist in landing a plane with one wing down. This occurs in the absence of monocular perspective clues such as trees or flag poles, etc. Until recently the cause of this was not known. Now it appears to be an objective manifestation of aniseikonia. A tilting plane was made at Dartmouth for which the primary position was parallel to the floor. The individual looked down at this plane as an aviator looks down on the landing field. Size lenses of various magnification values were placed in front of the eyes and the tilting plane changed in position until the plane appeared to be horizontal. Here, as before, when the magnifying lens was placed before the right eye of a patient having no aniseikonia, the

tilting plane had to be raised on the right side in order to appear level to the patient. The reverse effect occurs with magnification of the left ocular image. The first type with the larger ocular image coming from the right eye, corresponds to the pilot who lands with the left wing low. Hence, when a pilot persistently lands with the left wing low one suspects aniseikonia in which the right ocular image is lower than the left. This phenomenon is of sufficient importance that the Civil Aeronautics Authority has asked Dartmouth to establish a clinic at Kansas City to investigate this more thoroughly. If aniseikonia of a marked degree exists in applicants, the knowledge of this would eliminate the expenditure of a large amount of effort and money in the training of pilots.

People with marked aniseikonia have many difficulties orienting themselves in the absence of monocular perspective clues, in other fields than in airplane flying. Hikers in mountains covered with snow, or skiers have difficulty maintaining a given direction of travel. Putting for golfers with aniseikonia is especially difficult due to faulty estimates of tilt of the ground. Many other examples could be mentioned but these I think will suffice as illustrations.

Subjective Effects of Aniseikonia

All of the subjective symptoms exhibited by people with aniseikonia are exhibited in other ocular difficulties. Prominent among these complaints are photophobia, headaches, asthenopia, car and train sickness, eyepains, gastro-intestinal symptoms and upsets, excessive nervousness, etc. None of these is characteristic of aniseikonia alone. If these difficulties persist after a careful elimination of refractive and fusional difficulties, and the presence of other constitutional disease cannot explain the symptoms, then aniseikonia should be suspected and referal through the proper channels made.

In patients suffering from aniseikonia probably the most prominent symptom is headache (usually of either the occipital or frontal type) : and the frequency of occurrence is about 80%. Following this in frequency is photophobia, which occurs in about 60%. Car sickness is very frequent. Eye pains occur in about half of the cases.

Aniseikonia and Other Visual Anomalies

Aniseikonia can and does occur in all types of ocular conditions. It is not an anomaly that is confined to anisometropia, antimetropia and

unilateral aphakia. It occurs for patients with bilateral emmetropia and those with little or no refractive error. In almost 60 per cent of the cases coming to the Dartmouth clinic there was emmetropia, or isometropia, or a difference of refraction not greater than 0.50 diopter. In cases of anisometropia and antimetropia, aniseikonia may exist comparable to the existing refractive difference; or there may be no aniseikonia, or it may even be of the opposite type. I might state at this point that there is no a priori manner in which size differences can be estimated except by actual measurement.

Aniseikonia, like other ocular anomalies, may be of low degree and cause difficulties in some patients, and be of relatively high degree and cause no difficulties in others. In general, size differences greater than 5 per cent are usually incompatible with single binocular vision. If size differences greater than this occur, usually partial or complete suppression in one eye occurs, or diplopia results.

It is felt at Dartmouth particularly by Bielschowsky, who has recently died, that aniseikonia is one of the underlying factors in strabismus. Since the measurement of aniseikonia requires simultaneous binocular vision of about equal visual acuity, the examination for aniseikonia in patients with strabismus is extremely difficult or impossible. No patients with unilateral amblyopia can be measured. In patients with true alternating squint, those not having simultaneous binocular vision (not single binocular vision) cannot be measured. Periodic squinters can usually be measured, and patients having simultaneous vision with both eyes with peripheral fusion, but not necessarily macular fusion. It is very laborious to measure these patients and the accuracy of measurement is of a low order. Nevertheless in some cases striking results can be obtained following correction for aniseikonia.

I was privileged to measure one such case while at Dartmouth. The patient had periodic esotropia. In the morning single binocular vision was usually present, but in the afternoon, after becoming tired, he usually squinted. Aniseikonic examination, requiring the use of prisms, was made. Following correction—the magnitude of which I have now forgotten—single binocular vision lasted throughout the day. The exophoria of about 20 prism diopters, of course, persisted, but the patient did not squint as long as he wore his aniseikonic prescription.

Bielschowsky mentions in one of his papers the case of a 25-year-old architect who had a convergent strabismus. He had been operated on

bilaterally for this condition. Subsequent to this he underwent further surgical procedures and was finally referred to Dr. Bielschowsky at Dartmouth. This case had a persistent "horror fusionis" and the surgical procedures were a complete failure as far as helping to produce single binocular vision was concerned. Orthoptic procedures proved valueless, and Dr. Bielschowsky gave a very pessimistic prognosis for the case. It was thought worth a trial to attempt to measure any possible aniseikonia. Professor Ames after a long (several days) and tedious aniseikonic examination found a size difference of 11% overall combined with 5.5% meridional, axis 150 degrees. Following correction single binocular vision immediately occurred and the patient has had no recurrence of squint in a number of years.

Other similar cases have given rise to the feeling that aniseikonia may be a factor in the etiology of squint.

At the present time reading problems are quite fashionable, for both educators and optometrists. Curiously enough aniseikonia seems to be a factor many times in such problems. Professor Dearborn of the Graduate School of Education at Harvard University, who has studied the relationship between reading disabilities and aniseikonia, reported on a series of 221 slow readers. Of these only 27 cases had no aniseikonia, 165 cases showed a size difference of from 0.5 to 2 per cent, while 29 cases had a size difference of more than 2 per cent. Out of another series of 116 cases of very serious reading disability, only ten cases had no aniseikonia. The average degree of aniseikonia for the remaining 106 cases was 1.75%. In 35 cases at Dartmouth corrected with aniseikonic lenses, 29 cases or 83% showed marked improvement. A striking case observed at Dartmouth may be worth mentioning. The patient, a business executive 60 years old, had always been a very slow reader. At board meetings he would hardly get started reading the material for discussion when all the other members of the board would be finished. This patient was a very intelligent man, and apparently comprehension did not enter into the problem. His reading technique corresponded to that of a 10 or 12-year-old child. When this patient's aniseikonia was corrected his reading technique suddenly increased to that of a normal high school student.

Photophobia that persists for apparently no reason organically disappears many times after correction for aniseikonia. At Dartmouth the first attempt to eliminate photophobia is to correct the aniseikonia and to discard any dark glasses worn by the patient. This procedure, of

course, does not eliminate photophobia arising from conditions other than aniseikonia.

Cases of apparently typical migraine occasionally respond favorably to correction for aniseikonia. I don't wish you to gain the impression that aniseikonia is one of the etiological factors in migraine. It is merely that by the correction of aniseikonia an added drain on the nervous system has been eliminated, and hence, since many cases of migraine are triggered off by situations that present excessive demands on the nervous system, one added load has been eliminated. One case may be mentioned here. A young woman patient had had weekly migraine headaches ever since late adolescence. After prescribing a correction for aniseikonia which was of a low degree, the headache occurred much less frequently. Most migraine cases, of course, do not respond so favorably.

An interesting case of sudden production of depth perception can be mentioned. A patient presented himself at the Dartmouth Eye Clinic with a number of subjective symptoms such as eyestrain, headache, photophobia, etc. The patient had no depth perception as measured by any of the usual devices, such as Keystone cards, etc. Measurements for aniseikonia were made. Following correction, normal depth perception immediately occurred as measured by the Keystone cards. Now this patient was not as happy with this condition as you might think. His method of space perception had completely changed and was as annoying, if not more so, than his former difficulty. It took him a number of weeks to become used to his new method of space interpretation.

Aniseikonia—Summary

As stated above aniseikonia may be small and cause difficulties in some patients and large and cause no difficulties in others. In general, small differences of 0.50 per cent or less usually cause no difficulties. As the aniseikonia increases in magnitude the number of people having symptoms, and the number of symptoms themselves increase. A size difference of about 5 per cent seems to be the upper limit compatible with single binocular vision. The type of the aniseikonia causing the most difficulty is the meridional type. Of an overall and meridional size difference of the same degree, the meridional causes by far the most difficulty.

Aniseikonia occurs about as frequently as heterophoria. This means that it occurs in approximately 75 per cent of patients. In those patients who are troubled by aniseikonia of low degree—up to one per cent say—there is usually some complicating factor such as a marked heterophoria

or fusional difficulty, or some marked neuropathic condition. One finds a parallel in the type of patient who suffers from a very small refractive error, or a small heterophoria in the absence of aniseikonia. Such patients are very sensitive, nervously speaking.

In cases in which there is a marked heterophoria co-existing with an aniseikonia one finds many times that correction of the muscle imbalance will not result in comfort if the aniseikonia is not corrected; whereas if the aniseikonia is corrected, correction of the muscle imbalance is not often necessary. This has led to the opinion held by some, that of the two anomalies, aniseikonia is the more important. This seems to follow from logical reasoning also. If the aniseikonia is eliminated so that fusion takes place with greater ease, the effects of phoria are minimized; whereas correction of phoria optically, in the presence of aniseikonia, is merely palliative.

In the statistics that have been published one finds that about 70 per cent of the population has measurable aniseikonia and of these about 30 per cent probably suffer from it in some degree. In those cases that have been corrected, between 50 and 60 per cent have been either completely relieved of their symptoms or greatly improved. About 15 per cent have been failures.

At present, attempts are being made to develop an instrument to be used by the optometrist to examine a patient, qualitatively or semi-quantitatively, for aniseikonia. Such an instrument seems necessary to ascertain whether or not a patient has aniseikonia in order to avoid useless referal. Quantitative measurement of aniseikonia is at present and probably will continue to be, for some time at least, a clinic responsibility.

DR. K. B. STODDARD
ASSISTANT PROFESSOR OF OPTOMETRY
UNIVERSITY OF CALIFORNIA
BERKELEY, CALIFORNIA

THE REMEDIAL POSSIBILITIES OF LIGHT THERAPY IN CHRONIC CONGESTIVE GLAUCOMA — A CASE REPORT*

Charles I. Saks
Syracuse, New York

Mrs. M. P., age 41, called for an eye examination on February 19, 1940. She had been having a pain in the left eye for some time, coming on about 8 P. M., becoming much more severe about one or two hours after retiring at night. The pain, originating over the left eye, extended over the left temple to the occipital lobe, and awakened her from sleep. She experienced no pain during or after sleeping in the day time.

The temporal portion of the ocular conjunctiva (of the left eye was markedly injected, the cornea was quite hazy and the pupil dilated and fixed. The outward appearance of the right eye was normal. On palpation, both eyes were quite hard.

Since the symptoms were so evidently those of chronic primary glaucoma, the patient was immediately referred to an oculist who informed me of the diagnosis—*scleritis!* I thereupon asked the oculist if he took the tension. He replied that the tension was somewhat high, +4. I said nothing more.

On March 1st the patient called on me for a refraction. The left eye was now decidedly worse in appearance, and the eye was quite sensitive to light. I phoned the oculist immediately and told him that the patient called for a refraction. He replied that the patient now has a chronic congestive glaucoma! I replied that this fact was my chief reason for referring this patient for medical attention. The patient had made several visits to this oculist prior to March 1st, during which time a miotic was instilled three times a day. The patient, then, was under miotics for about two weeks prior to March 1st.

I asked the oculist if he had any objection to my advising the patient to sleep with a light over the face, since the pains were far more intense during the night. Fortunately, he consented readily. A twenty

*Submitted for publication March 14, 1940.

watt bulb was used. On March 12th the patient called for her glasses. The left eye had cleared up almost entirely. The cornea was clear and the pupil constricted to its former size. The pains had disappeared almost entirely. It required three nights before the patient had noticed any relief. The patient could not understand why I did not advise the light at the time of her first visit. I reported the eye condition to the oculist on March 13th and he was pleased to know of the condition of the left eye.

While this is the first case of chronic congestive glaucoma to which light therapy has been applied, it seems that the *remedial possibilities* of light therapy in chronic glaucoma are indeed very promising. Once the congestive stage has been reached, the tension will most likely remain well above normal. However, if we can prevent a further rise in tension, our efforts shall not have been in vain. As was pointed out in a paper by this writer in the February, 1940, issue of this Journal, the tension in the chronic glaucomatous eye will remain above normal because of the probable proliferation of neuroglia within the eyeball.

The consideration of a *variable* light stimulus also seems to have possibilities in the treatment of chronic congestive glaucoma, even though such possibilities are purely theoretical. Should we find a case that does not respond to the steady glow of a light, a *variable* source of illumination may succeed in causing a *pumping action of the blood vessels—increased light causing constriction, and subdued light causing dilation. Either steady or variable illumination will be of benefit only so long as there is sufficient tone of the muscle fibres of the intraocular vessel walls.*

A very economical means of providing variable illumination could be had by using a lamp with a rotating chimney having perforated fins on top, the entire chimney being mounted on a pivot. The heat of the lighted bulb causes the rising column of heated air to rotate the chimney. The chimney wall is made of a transparent substance, part of which may be painted black, the rest remaining transparent. Such a lamp may be purchased for about one dollar in any furniture store. Since I have had no opportunity to test the principle of *variable* illumination, it is necessary to repeat that its possibilities are merely theoretical.

DR. CHARLES I. SAKS
248 NORTH SALINA AVE.
SYRACUSE, N. Y.

AMERICAN JOURNAL OF OPTOMETRY

Established 1924

Vol. 17 JUNE, 1940 No. 6

EDITORIAL BOARD AND STAFF

DR. CAREL C. KOCH ..... Editor and Publisher
DR. GUY L. DuPLESSIS ..... Associate Editor
DR. CLARENCE W. MORRIS ..... Associate Editor
HARRY B. BROOKINS ..... Advertising and Production Manager
LILLY ETTE KOCH ..... Circulation Manager

Publication office: 1501-1504 Foshay Tower, 821 Marquette Ave., Minneapolis, Minn.

Annual Subscription, $4.00 in Advance; Canada, $4.50; Foreign, $5.00.
Single Copies, 50c.

Original papers, scientific communications, clinical reports, books for review and correspondence should be sent to the editor. Subscriptions and applications for single copies should be addressed to the circulation manager. Copy of advertisements must be sent in by the first of the month preceding their appearance. Communications with reference to advertising or other business should be addressed to the advertising manager.

Published Monthly by the
American Journal of Optometry Publishing Association.

The Journal has no objection to the reprinting by other magazines of any of its articles, provided such reprints are properly credited to the AMERICAN JOURNAL OF OPTOMETRY.

RECOMMENDATIONS AS TO THE METHOD OF ESTABLISHING A PROGRAM OF PUBLIC RELATIONS FOR OPTOMETRY

No doubt most of our readers have followed with considerable interest the excellent series of articles dealing with *public relations* and its application to optometry, which have been appearing monthly in the AMERICAN JOURNAL OF OPTOMETRY since February of this year. The fifth article of this series will be found in this issue. In these informative and well prepared papers, the author Morris has made a number of important suggestions to the American Optometric Association, to assist the delegates and officers of that optometric society, in their present planning of this important part of the work of that association.

That the A.O.A. must engage in a well developed program of public relations goes without saying. Just how this should be done and just what well thought out steps must be taken to make this work most effective has been the subject of a thorough study made of this vital matter by Morris, who has then placed the facts and the issue squarely before the A.O.A. In his review of this matter Morris has made the following recommendations to the delegates of that body.

(1) An investigation should be made by a committee of the A.O.A. of the several available public relations counselors and publicity agents to determine their relative qualifications and experience. This investigation should inquire into the type of clients previously served by each applicant, and what each can show for his efforts on behalf of his clients. A decision based upon a comparative study of this kind will insure both satisfaction and economy.

(2) A study should next be made of the specific optometric recommendations made by the several public relations counselors and publicity men. The final decision of the committee being based upon such comparative study of proposed plans.

(3) For the sake of coordination and integration of certain important optometric activities, a public relations counselor should then be employed.

(4) A study of the needs of optometry and the requirements of the public relative to proper eye care should then be made by this expert in this field of public relations.

(5) For the sake of efficiency all A.O.A. departments and committees now engaged in various phases of public relations work and publicity activity should be consolidated into one general committee on public relations.

(6) Only optometrists sympathetic with the major purposes of this committee should be appointed.

(7) With the assistance of the public relations counselor, this committee should then develop a "National Plan for the Advancement of Optometry," which would integrate and correlate all phases of optometric activity.

(8) For the sake of economy all of the scattered departments of the A.O.A. now engaged in various phases of public relations and publicity activity should be consolidated into one office with only one overhead and only one staff of employees. The expense of maintaining

several offices with obvious duplication in rental expenses and office help should be eliminated for economy as well as for efficiency.

(9) Using the "National Plan for the Advancement of Optometry" as a basis for future action on the part of the A.O.A., a nation-wide drive for funds should be engaged in on the part of the A.O.A. and its various subdivisions to finance the activities of this organization in the fields of public relations.

(10) No solicitation of funds from optometrists should be made without first submitting to them the definite outline of the proposed activities for which the funds are solicited.

(11) All such funds as are collected should be handled in the regular manner and should go through the hands of the national secretary. The disbursement of all such funds on an emergency basis without the safeguards of regular procedure as prescribed in the by-laws is indefensible. Only a portion of such special funds as are raised should be placed in the special "emergency-fund" account and when these are disbursed by presidential order *in an emergency*, a voucher for approval of such disbursement should follow the regular procedure of the by-laws, and the "emergency-funds" account should then be reimbursed.

(12) At regular and frequent intervals the national secretary should provide the secretaries and presidents of affiliated organizations, as well as any member upon request, a statement of the receipts and disbursements of all A.O.A. funds including the "emergency-fund."

(13) The A.O.A. is now holding funds amounting to some thousands of dollars which has been subscribed with the request that same be used for publicity. A tabulation should be made of such donations giving the name of the contributor, the amount contributed and the designation for which the funds are to be applied. Copies of said report should be mailed to the secretaries and presidents of all affiliated organizations.

(14) Funds now in the hands of the A.O.A. which have been contributed with the specification that they be used for publicity should be made available now to the Committee of Public Relations for publicity purposes.

(15) As much valuable time has already been lost and considerable money has already been expended in the field of public relations on activities of doubtful value to optometry, it is suggested that the foregoing proposals be put into effect without further delay.

Carel C. Koch.

PROCEDURE AND INSTRUMENTATION

By Guy L. DuPlessis

A department wherein discussions will be carried on relative to the value of various experimental and clinical techniques as employed by practicing optometrists, and also in which the instruments used by optometrists in various phases of their work, will be subjected to some critical evaluation.

ORTHOPTIC AND READING TECHNICIANS

Elsewhere in these pages notice is given of the creation of the BRITISH ORTHOPTIC JOURNAL. This Journal is the official organ of the British Orthoptic Society. The group is composed of medical technicians in the employ of hospitals or surgeons. No criticism of this activity is intended, but it must be realized that this group operates in competition with British optometrists, or as they are known in England, refracting opticians. This group has a membership of 112 members of which 105 are in the British Isles and presumably they operate under the direction and inspiration of the British equivalent to our American ophthalmologists. Initial and most valuable contributions to orthroptics were made by the medical professions in the past, but the field has been so neglected by the medical profession in general, that optometrists have been at work in that field now for many years and have also made a number of important contributions to its development.

We might well ponder if these contributions have been sufficient and we might well worry in the fear that refraction work itself is causing us to neglect this field as surgery and therapeutics have caused ophthalmology to also neglect orthoptics. In recent years the field of correction of reading dfficulties has aroused considerable interest among optometrists, educators and to a lesser extent in the medical profession. In spite of the optometric difficulties involved, optometrists have studied the subject and made good contributions to that field. But again we may wonder if these contributions have been sufficient to identify us with that work.

Daniel Baker College in Brownwood, Texas, announced for this summer a laboratory and short course of clinics for reading difficulties and remedial procedures. This is open to anyone and ophthalmologists and optometrists are specified by name and are invited to become read-

ing clinicians. Lay persons and office technicians are invited to enroll and learn this work.

Again no criticism of this offering can be made on academic grounds, but we may well wonder if it is wise to encourage the entry of lay persons into a field as complex as visual physiology and physio-psychology. It may be that American optometrists are neglecting this field and that in their dialectic squabbles over refractive procedure, they fail to recognize nearby fields of development fertile in optometric possibilities. No educational program offers any thorough presentation of any subject at present except in the field of pure (?) refraction. An educational program for optometrists cannot be operated for a profit, at best it should be self-sustaining. It should be co-ordinated, if possible, to utilize effectively all the possibilities available in optometry today.

RED-FREE MERCURY ARC LAMP

This attachment for the Binocular Ophthalmoscope of the *Bausch and Lomb Co.* is a monochromatic source of light to enhance details of the retina and to eliminate the blur caused by white light. Monochromatic light sharpens details of the retinal structure by reducing chromatic aberration both in the eyes of the subject and the observer. This permits observation of details not visible under ordinary illumination.

AN OPTICAL TONOMETER

It is not customary for this department to make mention of equipment not yet available to the profession and so to speak in the "thinking stage." But because of the discussions on glaucoma recently published in this department and because of the ingeniousness of the method suggested, this rule is relaxed.

The February, 1940, issue of the COLUMBIA OPTOMETRIST contained an article by Charles I. Saks entitled *An Optical Tonometer*. The objection that the mechanical tonometer measures the impressibility of the eyeball, and that because of structural resistance this does not represent the intra-ocular pressure is obviated, according to the author by the

use of a polarizing tonometer which he describes as follows: "Illuminate the eye under examination with a beam of plane polarizing light which, when reflected from the retina, should be made to pass through a tube-like ophthalmoscope containing an analyzer. The eyeball will act as an interposing medium between polarizer and analyzer. The incident source, with the polarizer, can be mounted on top of the tube. A diffusing screen, such as piece of ground glass, should be inserted between the light source and the polarizer. It is necessary to use a diffusing screen in order to see the strain figures. The polarizer on top of the tube should be mounted so that it may be rotated in a rim graduated in degrees. In this manner it will be possible to rotate the polarizer until the strain figures have been made to disappear. By determining the degree of rotation of the analyzer necessary to cause disappearance of the strain figures, and determining the intra-ocular pressure with a mechanical tonometer, it may be possible to establish a table of equivalents in degrees that may give a reading in terms of millimeters of mercury."

I have never seen reference to strain figures observed in the cornea by polarization and it might be questionable that intra-ocular pressure would elicit an optical strain such as is produced in glass, and observable by polarized light. Saks does not indicate that preliminary investigation makes the method possible from an optical standpoint. It is to be hoped in view of the novelty of the idea that we shall soon hear some pronouncement on the feasibility of the method.

A NEW LIGHT-WEIGHT TRIAL FRAME

The *Spencer Lens Co.*, a subsidiary of the *American Optical Co.*, announces a new trial frame of improved construction. The chief features of this frame are a corneal aligning device and specially spaced cells for lenses. This permits exact additive effective power when Tillyer lenses are used and greater precision in the final prescription from the test lenses employed in the examination.

ORGANIZATION AND JURISPRUDENCE

by Clarence W. Morris

A department in which some of the organization problems of Optometry will be discussed and in which certain of the legal aspects of refractive work will be reviewed.

A PUBLIC RELATIONS COUNSELOR FOR OPTOMETRY

A year ago the optometric agitation for a vigorous program of Public Relations for Optometry was apparently opposed by the OPTOMETRIC WEEKLY. Public relations was consistently treated editorially by the OPTOMETRIC WEEKLY as if it consisted only of publicity. In an editorial entitled *The Optometrist and Publicity* (May 11, 1939), we find a discussion of publicity which recalled the six million dollar "National Educational Program for Optometry" of 1930. The proponents of a real program of public relations were quick to point out the fact that this six million dollar scheme was not publicity nor public relations, but ADVERTISING. This six million dollar project called for the use of paid space in newspapers and the use of paid radio time. This type of program is not, in the writer's judgment, adapted to the needs of any profession. The cost is prohibitive and its effectivity negligible. It was also pointed out that if a profession has an interesting story both radio time and news space can be obtained free. The public eagerly reads the news columns whereas the advertising space is given somewhat less attention. Advertising is not a medium by which a profession seeks to interpret itself to the public.

In this editorial, the issue of socialized medicine was also seized upon to justify the failure to adopt Public Relations. We quote (page 353), *"Our members are wrought up over the menace of socialized medicine. They aren't in the mood for anything else. We ask our readers—Would you have acted differently; would you have carried on for publicity, or would you have dropped everything else to focus all efforts on the pending health bill?"* No one has explained satisfactorily why it was necessary to abandon public relations in order to meet the problem of socialized medicine. It was pointed out that both should have been done and that Public Relations would have helped to solve the problem of socialized medicine. The A.O.A. policy was defended with the inane plea that if optometry were defeated, there would be nothing left to publicize. This defeatist attitude was refuted when it was shown that social-

ized medicine would not of necessity be injurious to optometry. Therefore the enactment of initial forms of social health legislation would not justify the cessation of effort to improve optometry and to better its position in the thinking and minds of all people. The suggestion that the position of optometry would be hopeless if socialized medicine were passed is both subtle and vicious. It reminds one very much of the advice Lord Runciman gave the Czechs at Munich. The postponement of the adoption of Public Relations by the A.O.A. could not be justified by this specious excuse.

This editorial impugned the motives of those advocating Public Relations. We quote, *"Our sorry history has always been that at a time when a president and his cabinet are on the way to real accomplishment, the hecklers step in to confuse the issue with, 'WE'RE AGIN IT—IT DOESN'T MATTER WHY—WE'RE JUST AGIN IT'."*

We also quote from an editorial in the OPTOMETRIC WEEKLY, written before the Los Angeles convention of the A.O.A. and published in the issue of June 15, 1939. In this editorial, the proponents of public relations were accused of subversive activities. We quote, *"We know that assembled among true and sincere optometrists will be a group of disgruntled men, who, during the past year, have been using underground methods to destroy the foundations that have been prepared. They have been in continual correspondence with each other, to prepare to lead a docile crew in another fight in Los Angeles. WITH PUBLICITY AS THEIR TALKING POINT. THEY WILL TRY TO UPSET THE APPLE CART."*

"It is twelve months since Richmond, filled with heckling which amounted almost to sabotage — While the majority of optometrists shouted for protection against socialized medicine, THE HECKLERS TRIED TO DISTRACT THE LEADERS WITH THE QUESTION OF PUBLICITY."

The writer has had the privilege of looking over some of this alleged correspondence. In the letters seen by him he has failed to find a single instance where a writer impugned the motives of the opponents of Public Relations.

We find in the OPTOMETRIC WEEKLY an editorial entitled *Convention Tid Bits* (July 20, 1939). In this editorial, publicity is casually dismissed as financially impossible and impractical. We quote, *"He (Van Kirk) understands the real value of publicity and realizes that you*

can't build a publicity campaign to reach out to one hundred and thirty million people on fourteen cents. A CAMPAIGN IS A GIGANTIC PROPOSITION AND EVEN THE SUM HE SUGGESTED, $150,000, WHICH PERHAPS CAME A LITTLE NEARER THE MARK THAN THE OTHERS, STILL WOULDN'T 'MAKE A DENT.' We enjoyed the report though, and wish to congratulate Van Kirk on his logic and wisdom."

We call the readers' attention to several facts. (1) The subject of Van Kirk's report was Public Relations and not Publicity. A Public Relations Program may include a large measure of Publicity but that does not make them synonymous. (2) The statement that Van Kirk's report recommended a budget of $150,000 for Public Relations is a gross misstatement. Van Kirk recommended a budget of $50,000 for Public Relations. The OPTOMETRIC WEEKLY created the impression that publicity is a tremendously expensive matter and even the inflated sum of $150,000 would be inadequate.

In another editorial entitled *Where Is the Dough?*, issue of February 8, 1940, the OPTOMETRIC WEEKLY uses the term "Public Relations" for the first time. We quote, *"So all of us, who are enthusiastic about the Public Relations Counsel must first find a Morgenthau, who is powerful enough to create a large enough fund so that Public Relations Counsel may not only be hired for one year, but may also go on and on as a continuous job. You would not start to build a house without having it completely financed first. Now the point is, not whether we should have a Public Relations, BUT HOW CAN MONEY BE RAISED IN SUFFICIENT QUANTITY TO SEE THE PROJECT THROUGH?*

. . . Yes, go on, Get the Public Relations Counsel and let him start to work, but get a fund first of sufficient size for him to do a really presentable, creditable job." The preceding is a good example of the "Yes-But" technique which was described in the February, 1940, issue of the AMERICAN JOURNAL OF OPTOMETRY on page 94.

Then in contrast to all the preceding editorial opinions we find on April 25, 1940, the OPTOMETRIC WEEKLY now boldly stepping forward as the advocate of the publicity which formerly was repudiated by them as frankly visionary and financially impossible. We again quote, *"In our recent survey, we tried to find out the real thought of our men as to what they wanted, and we were convinced that in the minds of all but a few who feel that they have a corner on knowledge, that there is*

just one thing that will put optometry side by side with dentistry, and that is publicity. THE PROFESSION HAS SPOKEN. PUBLICITY SHOULD BE OUR GOAL."

The OPTOMETRIC WEEKLY says that the public relations work accomplished in dentistry was done by dentists without compensation from their national association. The writer advocated the same arrangement for optometry in the April, 1940, issue of the AMERICAN JOURNAL OF OPTOMETRY, page 188. We quote, *"In a specialty such as public relations wherein specialized talent is required, the members of the profession should serve on committees in an advisory capacity without pay, in cooperation with paid lay specialists."* We are pleased to find that the OPTOMETRIC WEEKLY now approves of this principle.

However, the OPTOMETRIC WEEKLY ignores the fact that such is not the case in optometry today. For we must remember that a goodly portion of the $50,000 already collected for this general type of work has been disbursed to optometrists for services rendered in the field of public relations. The writer believes that if the same amount had been invested with an experienced lay specialist, optometry might have enjoyed the benefits of some genuine public relations work instead of getting what many optometrists believe to be an amateur job of experimentation to date.

And to again refer, for a moment, to this editorial in the OPTOMETRIC WEEKLY, issue of April 25, 1940, in regard to the pronouncement that publicity is the decision of the profession. We note that no data is given in respect to the survey mentioned, as having been conducted by the OPTOMETRIC WEEKLY. The writer would like to ask if this survey data is available to any who might be interested?

The thesis, too, that Public Relations work should be carried on EXCLUSIVELY by the members of the profession, we question. In this regard we cite a medical authority. We quote from the April, 1940, issue of the AMERICAN JOURNAL OF OPTOMETRY (page 187), *"At the recent National conference on Medical Science on February 11, 1940, one of the speakers was Dr. Edward J. McCormick of Toledo, who is rated as a medical authority on Public Relations. In summarizing his remarks Dr. R. L. Hane writes in the* CADUCEUS *(March, 1940, page 7) 'HE BELIEVES THE FIELD OF PUBLIC RELATIONS IS A SPECIALIZED ONE AND OUR PROFESSION CAN BEST BE SERVED BY HIRING SPECIALIZED TALENT."* That is an

expert's opinion. A medical opinion of one who is rated by physicians as being an authority on public relations.

Let us consider also the assertion that publicity would put optometry and dentistry on equal footing. This is not necessarily the case as dentistry has several obvious opportunities now lacking in optometry and it is doubtful if publicity alone would secure these for optometry. A full program of public relations, with all this implies, might, however, do much to help our profession. In other words, publicity is perhaps all that dentistry now needs. The writer is sure optometry needs a greater measure of service than publicity alone. However, he is willing to admit that a really good publicity program would be better than nothing. But a good publicity program is to a good public relations program as a slice of bread is to a whole loaf. Optometry can afford the whole loaf. Optometry needs the whole loaf. Optometry has paid the price of the whole loaf ($50,000) during the past year. Why not give optometry the greatest measure of value received for the money already collected? Optometry has demonstrated its ability to pay the price of a full program of public relations. Let us have a full program.

All that might be hoped from a publicity program would be a stimulated consciousness of the fact that there existed a profession known as optometry. This is very good and desirable but such a publicity program seems ineffective to meet the problems facing optometry today. In its place we urge a full and large scale public relations program which will include publicity as one of its activities. There is a vast difference between a publicity program and publicity built upon a sound program of public relations. We cannot go into the difference between these two at this time but for those who desire to get first hand up-to-date information we recommend that they purchase a small book entitled, *"At The Bar Of Public Opinion,"* by John Price Jones and David McLaren Church. The book is easily read in a short time and it is worth its price of $2.00.

Much has been made of the fact that funds are difficult to raise in optometry. The difficulty is not in getting funds. The difficulty lies in infusing ideas of courage and audacity into our leadership. With the right ideas, with courage in our financial readiness to contribute, with confidence in our professional destiny, with far-sighted vision and a bit of audacity there is no achievement that proper leadership and optometry could not attain.

CORRESPONDENCE

PRESBYOPIA AND CONVERGENCE INSUFFICIENCY. COMMENTS UPON CASE REPORT.

To the Editor: I read with considerable interest the article by Morris,[1] and while I have no intent of discussing the case itself, in the interest of accuracy I would like to comment on some of the points brought up in his discussion of the techniques of the *Graduate Clinic Foundation* as taught by the O.E.P.

Assuming that the No. 9 finding is the base-out prism which creates a blur comparable to a +0.25 D. sphere when added to the No. 7 finding, and assuming that the findings from No. 16A through to No. 21 inclusive were taken through the net of No. 14B, and assuming that the No. 19 finding needed a +1.00 D.Sph. added over the No. 7 finding to enable the patient to read No. 62M type with difficulty at 13 inches, which would give us a No. 19 finding of +1.50 D.Sph., then this case types a B 1 type, and not a C type case at all.

The reasoning on the duction findings, according to the O.E.P., procedure is that these are signals of interference, and in typing them, if both findings are low, they are placed in the number one chain, and the lower of the findings in the number two chain. In this case both No. 10 and No. 11 findings are low. However, No. 11 is the lower of the two. Therefore we have an informative sequence which reads as follows:

$$7 + \frac{(11\text{-}16B) \qquad 15 \qquad 16A\text{-}17A\text{-}21\text{-}19}{(\ 5\ ) \quad 6 \quad 14A \qquad\qquad 20}$$

This sequence of findings tells us in effect that this patient has the type of hyperopia which is helped most when full plus at all points is prescribed. The No. 6 finding, high, indicates that the patient will accept without interference at least the No. 7 finding at intermediate points.

The No. 14A finding, high, and the No. 15A finding, low, tells us that the patient will accept more plus at near than is manifested in the No. 7 finding. The No. 20 finding, high, and the No. 21 finding,

[1]Clarence W. Morris. A Report of a Case of Convergence Insufficiency with Presbyopia (a C3 type case). With some additional remarks upon Prism Therapy. American Journal of Optometry. Vol. 17, No. 4, pp. 145-152.

low, gives a warning that the patient has developed a defense against the net of the No. 14B finding at near.

Our next consideration would be the corrective sequence. The first indication of possible plus at near is the net value of the No. 14A finding which in this case would be +2.00 D.Sph. The net value of the No. 14B finding being also a +2.00 D.Sph., gives us added information indicating the acceptance of this +2.00 D.Sph., at the near point. Assuming that the No. 20 and No. 21 findings were taken through this +2.00 D.Sphere, we find the first rejection of this as a near point correction.

A near point correction of +1.50 D.Sph., total would give us a No. 20 finding of —0.75 D.Sph., and a No. 21 finding of +1.25 D.Sph. Since this is an uncompleted B type case, we strive to leave the No. 20 finding lower than the No. 21 finding.

Following through the O.E.P. procedure, in this case lens orthoptics would be used, the patient being given a bifocal with a lens addition which would give a total value at the near point of +1.50 D.Sphere. Those of us, who have followed this procedure, have found in most cases that the duction values improved. The patient completely satisfied and the case findings tending toward their normal expecteds. These improvements or a tendency towards them is what is looked for, at the time of the twenty-one day progress report.

As was said at the start, I have no intention of discussing the techniques used by Morris in his handling of this case. The fact that he reported entire satisfaction on both the part of the patient and himself indicates his success insofar as he is concerned. It further proves that any one particular approach to a problem is not necessarily the only approach possible. I am also convinced that Morris had no intent of unfairness in making the statements he did regarding the *Graduate Clinic Foundation*. However, in fairness to the Foundation and the O.E.P., those readers unfamiliar with this technical work could and may get an entirely erroneous conclusion from what he did say. The AMERICAN JOURNAL OF OPTOMETRY being a scientific publication makes the above mentioned result all the more serious. Therefore in the spirit of constructive criticism, I would suggest that where comparison of techniques are presented, accuracy in presentation in both techniques should be striven for, to the end that confusion and misunderstanding be avoided.

DR. O. J. MELVIN,
1202 CITY NATIONAL BANK BLDG.,
OMAHA, NEBRASKA.

SPECIAL REPORTS

COMMENTS ON THE PROPOSED ACTIVITIES OF THE EDUCATIONAL COUNCIL*

W. S. Farmer, Opt.D.
Oklahoma City, Oklahoma

The original plans of the Educational Council, published in the OPTICAL JOURNAL AND REVIEW, June 1, 1939, recommended, among other things, that the whole question of optometric education be delegated to the Council, deans of optometry schools, professors and the I. B. B.; that uniform examinations be given in all states twice a year under the auspices of the National Board of Examiners, whose membership was to be selected from teachers and educators.

Six year university courses were also proposed for optometry students, and it was further suggested that optometry raise a fund of $100,000 to be used in connection with the establishment of such six year university courses.

This report has faint praise, if not out and out criticism and ridicule for the independent schools and colleges and the thousands of optometrists, who practice with a degree from these schools.

This report, however, was not adopted in full at Los Angeles, but a substitute report by the same sponsors was adopted by the acceptance of Resolution No. 17, as amended.

We mention the above excerpts from the original plans in order to analyze the motives and purposes of the sponsors of the plan. Suppose we now examine the proposed plan that was adopted by the passage of Resolution No. 17, as amended, and reported in the JOURNAL OF THE A. O. A. of July, 1939.

This resolution was presented to the House of Delegates by the Chairman of the Resolution Committee reading the resolution and immediately moving its adoption. This important document was not placed in the hands of the individual delegates, although it affected every optometrist, both graduates and under-graduates; and affected as well as our schools and colleges. Note further that the purpose of the resolution was to adopt *in all respects*, the report of the Council on Education previ-

*Submitted for publication February 27, 1940.

ously made. We quote the WESTERN OPTICAL WORLD, "That this resolution comes not from a plan but for a man is self-evident." (Page 479, December, 1939.) We do not criticize the Trustees, the Resolution Committee or the House of Delegates. The resolution was conceived in the mind of the man responsible for the plan. This resolution, in all of its plans and ramifications, was adopted by *a voice vote only*. How would Congress or our State Legislatures proceed with a measure that would effect all of the people?

Now, as to the permanent creation of the Council and a five year plan; this committee or council should be appointed from year to year. Otherwise such committee or council would supersede the authority of our regular elective officers and trustees. The five year plan reminds us of the "five year plan" promised to the Russian people by the present dictators.

Let us now examine the plans contained in the Report as adopted by the acceptance of the Resolution.

Section One

It will be observed that the council named a practicing optometrist as the seventh member of the Council only after it had been vigorously pointed out by the opponents of this measure that the Council was not controlled by optometrists. Note further, the Council was to *consult* with the I.B.B., schools, groups, associations or individuals; *BUT* the Council was to have complete jurisdiction in the matters named in the Sub-sections A., B., C., and D.

Section Two

The subjects of Anatomy, Biology, Ocular Pathology, Ocular Neurology and Ocular Myology were not included in the list of subjects, although these important optometric subjects are taught in practically all of our recognized schools and colleges, together with the other named subjects in Section Two. Is this an attempt to limit us in our present educational requirements? This section will become operative June 1, 1942 *unless repealed*.

Section Three

The National Board of Examiners with broad powers, would probably indirectly control or supervise the duties of the individual legal State Boards. A National Board of Examiners would be, in the writer's opinion, a superfluous organization. It would interfere with individual

states rights and therefore may be unconstitutional. The individual states have different state problems confronting them. The National Board would be unnecessary since all necessary advice, suggestions and rulings should come through the I.B.B. If the A.O.A. is not content with the activities of the I.B.B., then a regular committee could be appointed from the A.O.A. to work with the I.B.B. in ironing out any difficulties of national importance; and when the committee has made its report to the A.O.A., the committee should be discharged as is done in most all other going organizations. Practically all states now have reciprocity by their laws and discretions. This is more democratic than by force or rule of a centralized board.

Sub-section A.: The members of the Council shall *appoint themselves* as Examiners of the National Board. This usurps the regular, legal appointing power of the President of the A.O.A. and the President of the I.B.B.

Sub-section B.: That the members of the Council shall conduct voluntary examinations for the purpose of determining the qualifications of the practicing optometrists regardless of their previous training, educational status or qualifications, and examinations before their respective State Boards.

Note also Sub-sections C., D., and E., which in our opinion usurp the power of the I.B.B. and our schools and colleges. The original plan, as published in the OPTICAL JOURNAL AND REVIEW of June 1, 1939, recommended optometric courses be extended to six years. This would, in effect, disrupt our schools and colleges and may stop the orderly growth of our profession. Radical and revolutionary changes are always dangerous. Any necessary changes could be made with suggestions and recommendations from the American Optometric Association and other groups. The effect of a sudden jump to the six year course will be obvious to all who are working to build the profession.

Section Four

Sub-section B.: Voluntary examination of optometrists, now in practice, divided into at least three main sections:

(1) Applicant's professional record.
(2) Written examination on subjects prescribed by the Council.
(3) Practical and oral examinations.

Sub-section C.: Post graduate attendance of at least one month in an accredited school with the resultant loss of time and expense from

our offices and practices, regardless of previous qualifications. Who would profit by the extra examination?

CONCLUSION:

The four outstanding corner stones of the profession of optometry are: (1) Organization; (2) Education; (3) Legislation; (4) Public Relations. We may as well attempt to drive a car with only three wheels as to ignore any one of these four important phases of the profession's structure. It is obvious too that they all must be built in unison.

It is gratifying to note that the history of optometry has been one of continued progress from that day nearly one-half century ago when that small nucleus of 183 charter members met in New York City and formed the organization that grew to be the present A.O.A. It is significant also that all great movements or organizations and even inventions started from small beginnings.

The world today is facing two major concepts: dictatorship governments on one hand and the government of democracy or self-government on the other. The dictatorship governments are run by a small clique of leaders, usually with a dictator at the head. This concept places the importance on the state. Individuals exist only for the benefit of the state and not the state for the individuals. While in the self-governing democracies, the state exists for the individual.

Throughout the history of the world the great advances of civilization have been made under liberty governments and civilization has practically always retrogressed or become disintegrated under the despotic dictatorship rule. When the rights of the majority are usurped by the minority; stagnation, chaos, disintegration and ruin have eventually resulted.

Just as all things grow from the tiny cell or its equivalent, so most professions, organizations and even optometry must grow from a small nucleus. We cannot superimpose patterns of thought from the top by force as is done in dictatorship. In optometry, the Number One basic cornerstone is organization. Now, it is needless to deny that this phase of optometry is one of the most important as well as one of the most neglected subjects of the profession.

Some men feel that this is the work of the individual states and their officers, especially the State Secretaries. Others are inclined to place the responsibility with the National Officers; especially with the policies

recommended by the National Officers and adopted by the delegates. Regardless of who is responsible, this condition needs the combined strength of our whole organization to increase the members in number and strength to the point where the great majority of practicing optometrists and practically all of the professional optometrists belong to their local, state and national organizations.

We do not believe, however, that this should be done by the dictatorship method but rather all eligible optometrists should be sold on the merits of their organization, because individually we can accomplish but little, but collectively we can accomplish much. Optometry performs a useful service to man-kind. Yet there are those who would divide our forces into different groups and thus weaken our profession by a division of rank and strength. The majority must be represented. The grand average must constitute the measuring rod. We, as optometrists, must retain the inherited privileges of initiative, invention, resourcefulness and freedom of imagination. We have in our hands the only instruments that have ever produced human progress, the cherished heritage of individual freedom, thoughts and actions. These privileges must be maintained in order that optometry can continue to grow and continue to present her case before the greatest tribunal in the world: *that of public opinion*. Our profession was developed by practicing optometrists. It can and will continue to grow under the control of optometrists. We must be ever watchful that this control is not taken from us under one guise or another. As practitioners, we are capable of directing the major policies underlying our professional life and we must insist upon the right to do so.

DR. W. S. FARMER
718-721 HALES BUILDING
OKLAHOMA CITY, OKLAHOMA

BOOK NOTICES

THE BRITISH ORTHOPTIC JOURNAL. Published by Wilding & Son, Castle St., Shrewsbury, England. 5 S., 6, prepaid. 1940.

This annual is to be the official publication of the British Orthoptic Society. According to the Register, this society is composed of female orthoptists, presumably assisting surgeons as technicians.

The first issue contains, among others, articles on the following subjects: Loss of Central Fixation, Observations on Partial Occlusion, Traumatic Heterophoria, Voluntary Diplopia, Suitability of Cases for Orthoptic Training, Occlusion, Divergent Squint, Approach to the Phorias. In addition it contains sundry articles by surgeons on operative cases selection and post operative procedure and finally a proposed Standard of Cures, both operative and non-operative whereby orthoptic cases may be pronounced cured.

This annual will not fail to interest the American optometrist who does orthoptic work. While many of the technics advocated are elementary, the point of view is sufficiently novel to provide interest and the treatment of the subject is generally thorough. G. L. DuP.

BOTHMAN'S FUNDUS ATLAS. Louis Bothman, M.D. Published by the Year Book Publishers, 304 South Dearborn St., Chicago, Ill. $17.00. 1940.

This atlas consists of 50 excellent six inch by three inch stereoscopic fundus photographs. These are designed for use in any 81 mm. stereoscope and have been so taken as to provide good depth perception. The photographs were taken with the reflex free Nordensen Fundus Camera and were then enlarged 3 x by a special method devised by R. W. Bennett of the University of Chicago Clinic. Each photograph is mounted on a card which also contains a history of the case and a report of the examination. This data is followed by a detailed description of the photograph itself, calling attention to pathologic variations from normal as seen through the stereoscope. The 50 photographs supplied, do not cover the entire field of pathology as viewed with the aid of the ophthalmoscope, but are intended to give a comprehensive familiarity

with major fundus abnormalities and as such will prove a valuable addition to the optometrist's reference library. G. L. DuP.

ABSTRACTS

THE INTERPRETATION OF VISIBLE PULSATIONS IN RETINAL ARTERIES. John E. L. Keyes and William F. Hatcher. Journal of the American Medical Association, Vol. 114, No. 21, 1940.

Ophthalmological opinion has been definitely that pulsation in retinal arteries is pathological. This statement is found in five out of eight recent ophthalmological texts. Upon recent observations and studies of the authors they conclude that retinal arterial pulsation is physiological and not pathological and can be observed in eighty per cent of patients that are suitable for ophthalmological study. They urge that new edition of ophthalmological texts correct this error. C. W. M.

MANUFACTURING OPTICIANS

Painstaking attention given to all details of your optical prescription by skilled technicians using only materials of recognized merit.

N. P. BENSON OPTICAL CO., INC.
Established 1913
Main Office: Minneapolis, Minnesota

- - BRANCHES - -

ABERDEEN EAU CLAIRE RAPID CITY
BISMARCK LA CROSSE STEVENS POINT DULUTH
WAUSAU ALBERT LEA WINONA

YOUR PATIENTS ARE ENTITLED TO THE BEST

Prescribe

"THERMINON"
Registered

SCIENTIFICALLY FORMULATED
COSMETICALLY CORRECT

An ophthalmic lens of extremely high efficiency. Now available to the discriminating refractionist

Ask Your Supply House or Write

THERMINON LENS CO.
DES MOINES, IOWA

KEYSTONE EQUIPMENT is GOOD EQUIPMENT

For any type of Orthoptic Training

For Office Use

The Telebinocular

The Tel-Eye-Trainer
With TeleRotor Control

For Home Prescription or Office Use

The No. 40 Correct EYE scope New, Handsome, Hardwood, Natural Finish.

The ES (Eye Skill) Series for the Stereoscope just Released. The best of the old: much more that is new. Great Variety and Interest.

The Old Eye Comfort Favorites, Alpha, Gamma and Delta - - Base Out - - and Beta and Epsilon - - Base In, still retain their popularity.

Write for futher information to:

KEYSTONE VIEW COMPANY, Meadville, Penn.
Stereophthalmic Division
Specializing in Orthoptic Training and Analysis Materials

Lectures On Motor Anomalies

By Alfred Bielschowsky, M. D.

These twelve lectures on motor anomalies of the eye by the late Alfred Bielschowsky, director of the *Dartmouth Eye Institute* at the time of his death in January, and international authority in this field, have hitherto been available only separately as published during 1938 and 1939 in issues of the AMERICAN JOURNAL OF OPHTHALMOLOGY, some of which are now out of print. They are now presented complete for the first time in book form.

Price $1.00 per copy. Mailed Prepaid

MAIL TODAY

Dartmouth College Publications ..... 19.....
Box 7, Hanover, New Hampshire

Enclosed find $.....for which please send.....cop.....
of LECTURES ON MOTOR ANOMALIES by A. Bielschowsky, M.D.,
with a Foreword by W. B. Lancaster, M.D.

NAME (*please print*) .....

STREET ADDRESS.....

CITY AND STATE.....

. . . *and they called that* SPEED!

Eighty miles in four hours and a half! Eighty miles over bumpy but "easy on the eyes" brown dirt roads. That was speed at the turn of the century.

Today, it's eighty miles in an hour and a half! Eighty miles over bright reflecting concrete roads. Eighty miles of straining to see.

This is just one example which shows how living conditions have changed in the last forty years. Man's inventive genius has made headway over nature's evolutionary processes. That's why the eyes of today eed to be corrected for the demands of today . . . and in many instances prescribing for spherical or cylindrical errors *alone* is not prescribing *completely*. Many patients need protection from excess light as well.

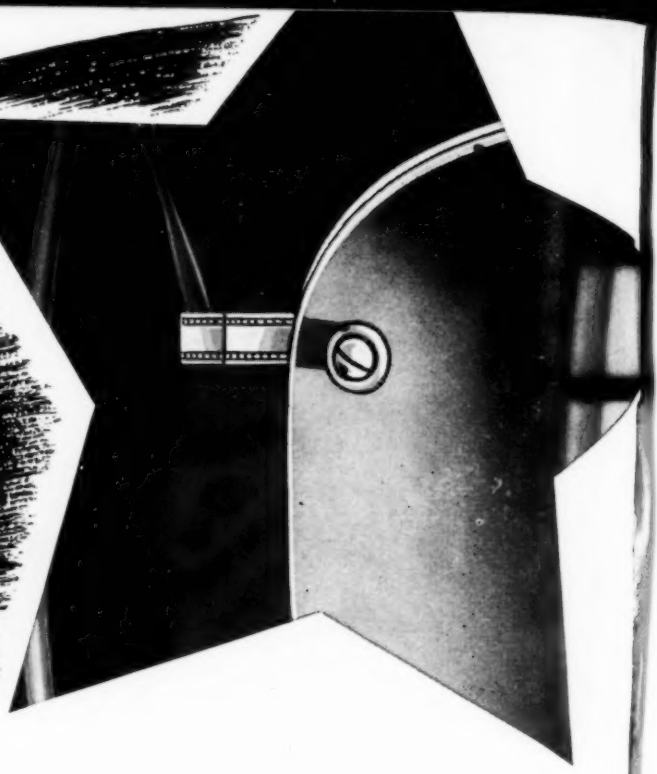
Make sure that your refractions are *modern* refractions by including the Light Tolerance Test in your examination routine. It indicates those of your patients who will enjoy greater comfort with Soft-Lite Lenses. The increased satisfaction which Soft-Lite Lenses give them means more referred patients . . . and a larger practice for you.

Soft-Lite Lenses

ETHICALLY ADVERTISED IN LEADING NATIONAL MAGAZINES BY THE SOFT-LITE LENS COMPANY, INC., NEW YORK · TORONTO · LONDON

FOR GREATER PATIENT SATISFACTION THIS TEST MAY SHOW THAT SOFT-LITE LENSES WILL ADD COMFORT TO YOUR Rx.

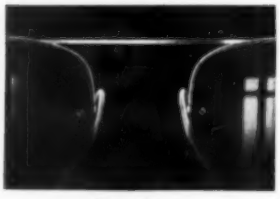
1940'S STAR!



★ ★ ★ SHURSET TOPRIM LOW FUL-VUE

Ronwinne

Ronvail



Ronbar

The "hit" of 1940 is Shuron's new Shurset Toprim Low Ful-Vue rimless construction. In the few weeks since it was introduced it has become a fast-selling favorite, so much so that Shuron's large factory has been hard pressed to keep up with the sensational demand. The reason is simple—Shurset Toprim Low Ful-Vue offers distinctive advantages found in no other rimless. The top arm carries all handling strain. Two-point suspension guards against all other strains and shocks; maintains lens alignment. Plastic-cushioned screws give added protection.

Shuron Shurset Toprim Low Ful-Vue is styled in three popular bridge designs—Ronwinne, Ronvail and Ronbar. Place your order now!

Shuron

ORIGINATOR OF STYLE IN EYEWEAR